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**WORLD**  
INCORPORATING QL USER

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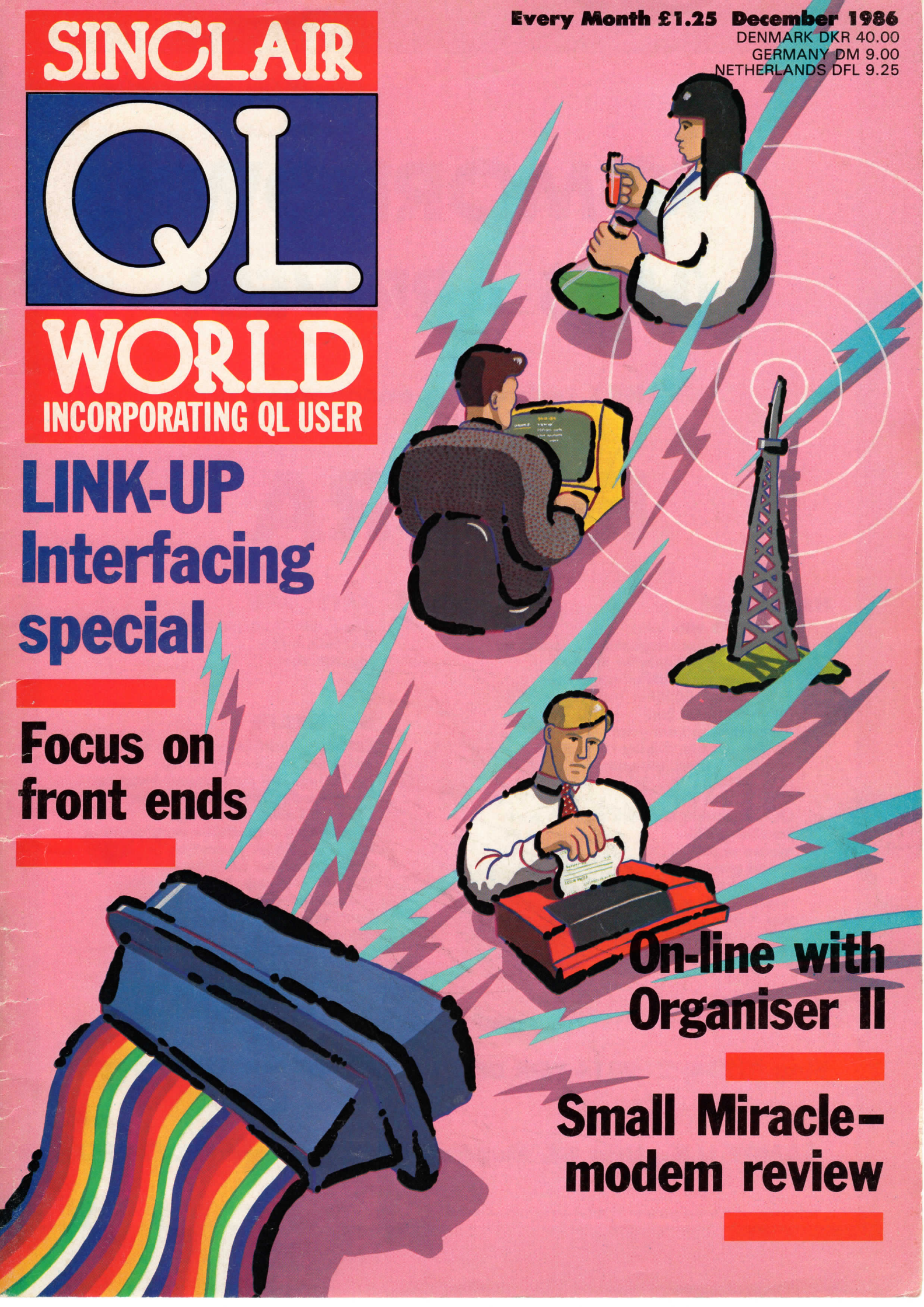
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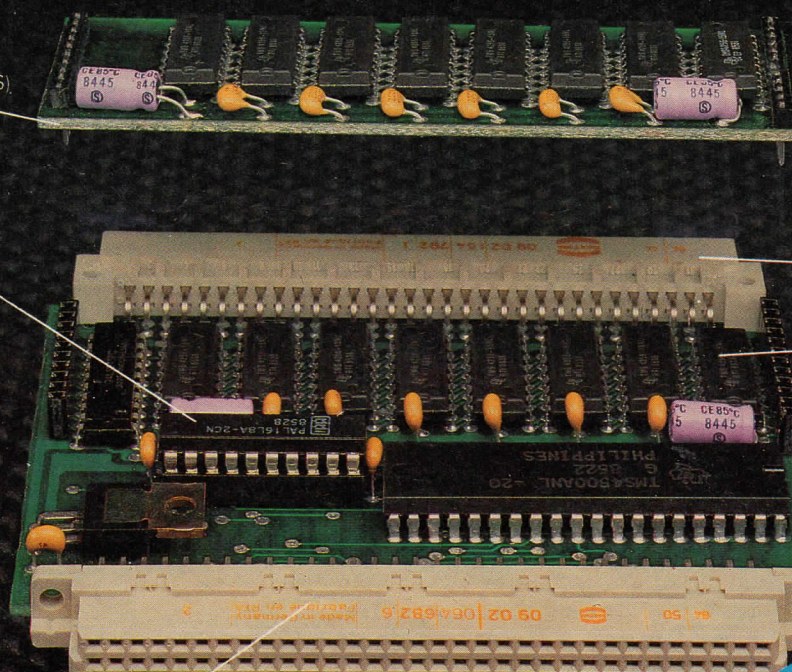
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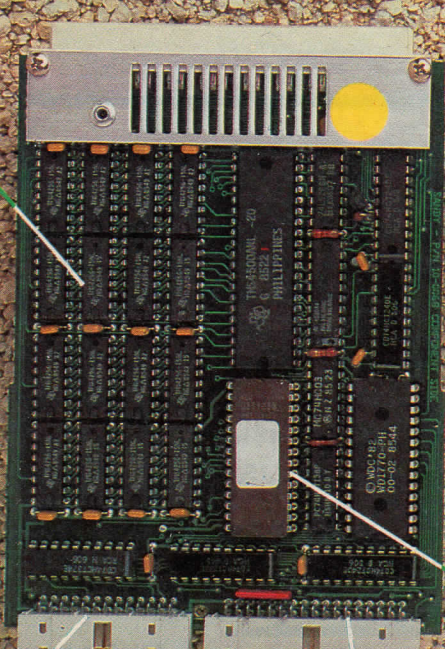
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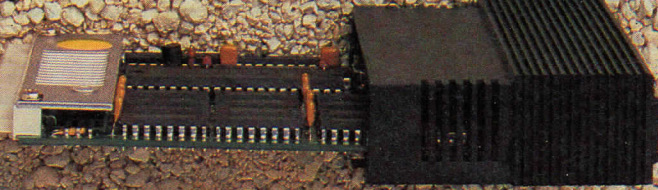
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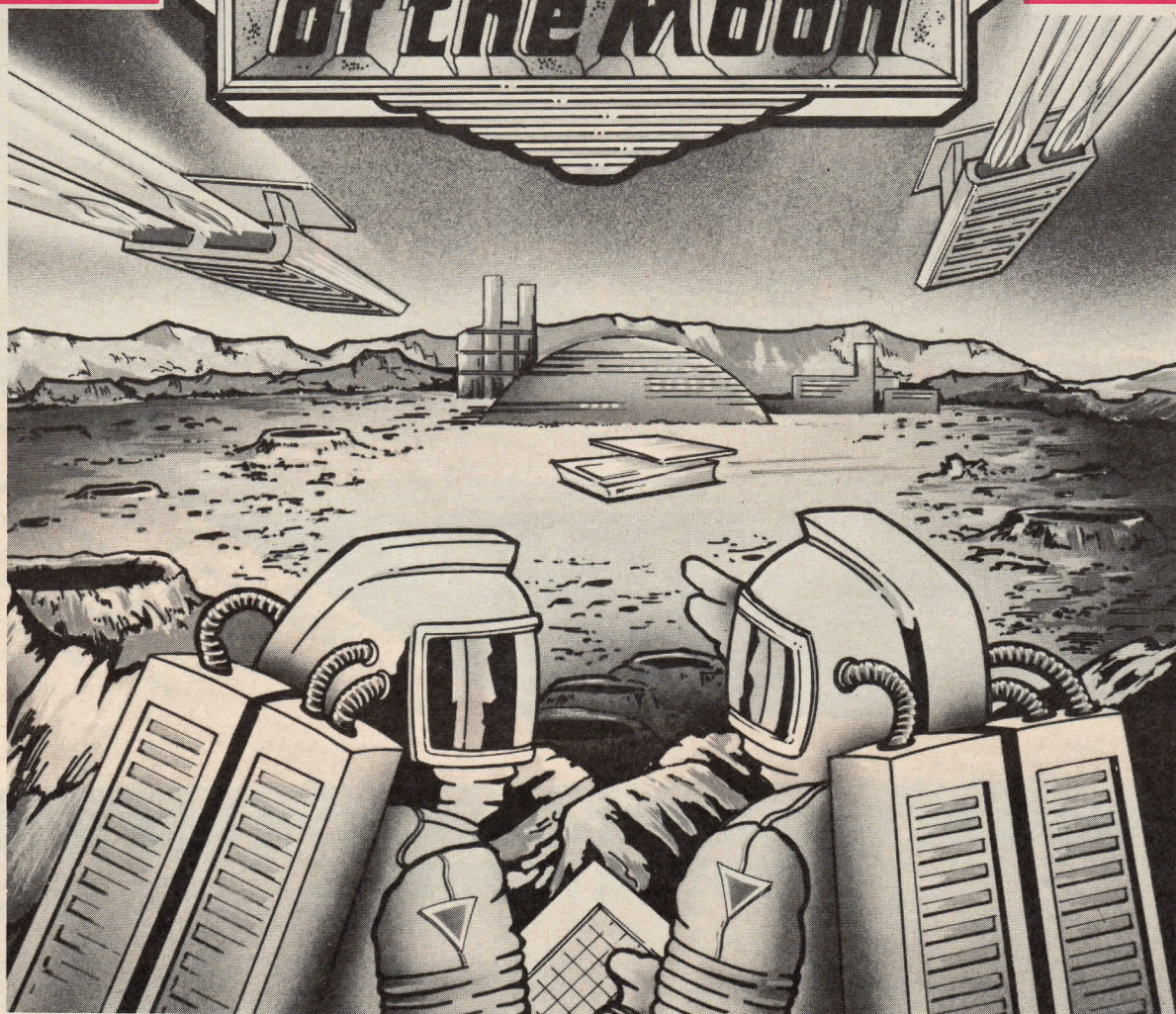
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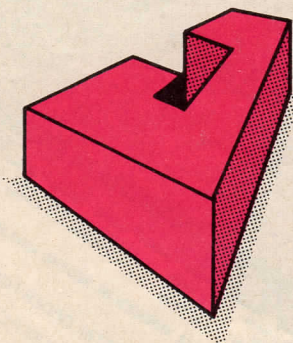
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INCORPORATING QL USER

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■ ■ DECEMBER 1986 ●

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## NEXT MONTH

### DIY Adventures

The Quill Adventure Writer from Gilsoft has the potential to open the door on new worlds of adventure gaming. We put it to good use.

### Even Better Basic

Digital Precision claims that its Better Basic Expert System will polish your programs, structure your syntax, and generally turn your SuperBasic into something to be proud of. Do the claims stand close examination?

### Plus

All the regular features and more, including speech synthesis, image digitisation, and other new hardware and software developments.

# PUT MORE TALENT ON YOUR QL

We've a great new range of high-quality products for your QL — ranging from practical tools and utilities to a colourful arcade game and a riveting text adventure.

Find out about them all in our new Software Catalogue. It's out now. It's **FREE**. If you haven't got your copy yet, phone us or write in — we'll send one out to you straightaway.

## CURRENT PRODUCTS

### THE LOST KINGDOM OF ZKUL

Explore the ancient dwelling place of the Dwarves and locate the treasure. A classic text adventure.

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### WEST

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SOFTWARE FROM SCOTLAND

## In the picture

The first video digitiser for the QL, from Pyramide, occupies the expansion port. Input is a normal video camera signal and does not require expansion RAM to process a picture.

Three modes are available — black-and-white resolution of 128 x 128 pixels in 125 grey-scale shades; low-resolution colour of 128 x 128 pixels in 125 colour shades; high-resolution colour of 256 x 256 pixels in eight colours. The digitiser will find useful applications for artists, making computer records of incoming documents and a host of other uses.

## Basic

By the author of the *Talent Assembler Workbench*, there is a new and exciting aid for budding and serious programmers. Machine code programmers will be familiar with indispensibility of monitors for debugging their code.

Features include single step through SuperBasic. Any number of conditional and unconditional breakpoints and user-selected variables can be displayed. You can read and adjust the value of any variable and there is a cross-reference listing for any variable.

## DIY adventures from Gilsoft

The Quill *Adventure Writer*, the program which spawned such adventures as *Hampstead*, *Terrormolinos* and *The Boggitt* on the Spectrum and Commodore 64, is now available for the QL.

Adventure Writer enables users with little or no programming knowledge to create text adventures on a theme of their choice. The program was made available initially at the October ZX Microfair where the publisher, Gilsoft, sold out of copies.

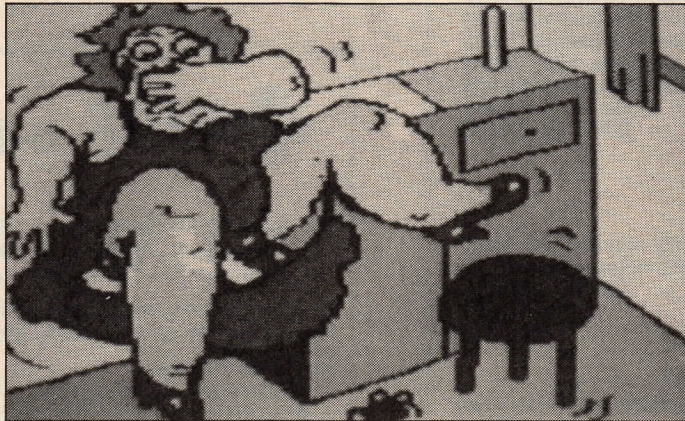
An illustrator which enables the creation of graphic screens to go with the text is available for other versions of the program. Asked whether

the company was planning a QL version, Howard Gilbert, of Gilsoft commented: "Our artist is working on it but whether we produce a final version depends very much on sales. I would say it is almost a definite possibility."

Adventure Writer is available in two formats. You can supply Gilsoft with two Microdrives or a disc and it will supply a copy, including manual, for £10.95.

Alternatively, the complete package, including manual and fancy packaging costs, £22.95.

Gilsoft is at: 2 Paul Crescent, Barry, South Glamorgan.



*Terrormolinos. A Quilled success.*

## Powerful Precision

New releases from Digital Precision cover a broad spectrum of applications. For professional and enthusiast programmers, *Better Basic Expert System* examines any Basic program, providing a range of options for creating a new structure in preparation for compiling it with *Supercharge* or for better structured programs.

The somewhat laconic title for another of the releases, *The Editor*, successfully hides a very powerful, very fast, full-feature text editor.

A few of its features include ability to produce command files for repetitive processing, compound commands for extracting index information for documents, and many more powerful features, once the sole province of good word processors.



*Digital Precision Supremo*  
Freddy Vaccha

## Sector software goes multi-tasking

Sector software, the company responsible for *Touch Typist*, has just announced its second software release for the QL. *Taskmaster* provides the QL with a true multi-tasking capability.

Most so-called multi-tasking software allows switching between different programs simultaneously resident in memory, but background tasks are suspended — they do nothing until you use them.

Taskmaster makes it possible, for example, to prepare a Quill document while Abacus carries-out spreadsheet calculations and Psion Chess works out its next move.

Also included is a disc organiser and calculator, output from which can be incorporated in Quill documents. Taskmaster costs £25 from Sector Software, 39 Wray Crescent, Ulnes Walton, Leyland, Lancs PR5 3NA.

## Fast RAM from Ultrasoft

Preliminary tests of a new high-speed RAM disc indicate that it may be a little faster than *QfLash*. A new display toolkit provides a range of commands for producing sophisticated displays.

A compressor toolkit provides seven new keywords for screen files, either in memory or in a file. Typical saving, depending on the exact structure of the screen, is between 40 and 60 per cent.

## The QL finds a voice

Maurice Computers has added a compact voice synthesiser to its QL product range. Words are built from 64 component sounds, each supplied with five pauses of different lengths. Mnemonics are represented by three-digit codes.

# ULTRASOFT

## UTILITIES FOR THE SERIOUS USER

### TOOLBOX II (v1.17)

A serious self-stipulating backup utility using only superbasic extensions. Make exact microdrive format copies. Clone to any device. 16 mixed files, 85K, cartridge to cartridge 35 secs., Ultrasoft dynamic ramdisk to ramdisk under 2 secs. **SAFE SURE CERTAIN PRECISE FAST FILE HANDLING** in a user friendly packet. Comes with Ultrasoft standard ramdisk, Ultradisk (dynamic ramdisk) and a real multitasking call up clock (depress ALT/SHIFT) with system information. The clock does not run as job, allowing you to respr, and to work undisturbed in any programme. Now you can really put your ramdisks to work. Completely QDOS compatible and with all programmes. DM79.00 £14.95

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### QKICK (v1.35)

QKICK is the programme for the user who needs to work. A fully multi-tasking programme called up to look at notes, calendar, etc while working with any other programme. Real windows, pull down menus and much more. For all the people who miss SIDEKICK (copyright Borland Int.) for the IBM or APPLE. Start letting your QL work for you with this real multitasking programme. DM120.00 £34.95

### DISPLAY UTILITIES (v1.15)

Display utilities is not only real windows but real windows with complete window channel handling with inverted windows, reversed windows, mirrored windows and nearly everything you have always wanted to do with windows and screens. You can only now really put those screens and windows to work. DM79.00 £14.95

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# TASKMASTER

### TASKMASTER

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# QL Storage *from*



## QDISC

Now containing the complete QL Toolkit software as well as an easily used Ram-Drive device driver, the CST QDisc is the longest established and most widely used floppy disc controller for the QL computer. The QDisc interface may be used with virtually any 3.5" or 5.25" floppy disc drives including, of course, CST's dual slim-line 720K (1 Megabyte unformatted) high performance, 80 track double sided drives. The Toolkit software provides a wide range of SuperBASIC commands and functions designed to allow the full power of the QL to be realised without resorting to machine code programming, giving access to job control, random access I/O, character sets, wild card file handling and so on. The Toolkit is included in the QDisc firmware, so it is ready for use as soon as the system is switched on, as is the Ram-drive device driver, which allows any unused memory to be used as a high speed storage medium, ideal for temporary results, and for saving screen images for high speed displays. Naturally the Ram-drive may be used to maximum advantage when used on a QL with additional memory such as the RAM-plus.



Expanding the QL's memory from 128K to the maximum 640K, the CST RAM-plus is based on the latest 256K DRAMs to give full speed no wait-state operation and is housed in an elegant aluminium case which matches the QL and provides an expansion port allowing a peripheral interface, such as a QDisc floppy or Winchester controller to be plugged in. Adding high speed memory to the QL has several advantages: all QL programs run faster, including ones that make heavy use of disc or microdrive as QDos uses spare memory for buffering data; increased data space is available for SuperBASIC, Psion and other application packages and the QL's multitasking ability is greatly enhanced by the ability to load several large programs simultaneously. The extra memory can also be used to advantage with the Ram-drive firmware supplied with the QDisc. For customers who have already purchased an earlier QDisc controller, the Ram-drive software can be supplied on floppy disc at a small charge.

**20MBytes!**

The flagship of the CST fleet of storage devices for the QL is the 20 Megabyte Winchester drive with integral floppy drive. The system is housed in a compact metal case with integral power supply and is interfaced to the QL by a small controller card. The floppy specification is the same as the standard QDisc; the Winchester is a high performance drive unit based on the new SCSI standard, which allows up to eight drives to be connected to one QL (available to special order). The Winchester firmware is fully compatible with standard microdrive and floppy QDos drivers, and also supports hierarchical directories and file date stamping. The directory structure allows files to be separated into compartments; for example, programs can be held in one directory while data for various projects can be held in other directories. This is essential when a disc can hold over 1000 files! Date stamping of files is used to keep a record of the last time every file on the Winchester was accessed, modified or backed up. This allows the Data Management Utility supplied with the system to archive only those files which have been changed since the last backup was performed. This greatly reduces the time taken to perform regular backups.



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<input type="checkbox"/>	QEP-III Eprom Programmer:	£115.00
<input type="checkbox"/>	Utility disc including ram drive (3.5"):	£10.00
<input type="checkbox"/>	Utility disc including ram drive (5.25"):	£10.00

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# O P E N

## Driver wanted

I am a student. The course I am following involves submitting a typed thesis to incorporate the results obtained from a year-long project. A few months ago I bought a QL to help with the presentation of the data, Quill being especially useful for this. The standard programs are perfect for the use to which I put them.

I have found a problem not relating to the programs. I have access to a Brother HR5 printer which I thought would be run from the HR 15 printer data, with a few

modifications, from Quill. After three months of exasperating experiments I still have not got a tick out of the printer which will work on a friend's Spectrum.

Are there any readers who have overcome this problem with the printer driver or is it me?

**David Chinn,  
St Austell,  
Cornwall.**

**Editor's reply: Brother has sent us a driver for the HR5 but there is no space to publish it? If anyone else wants a copy, write to us enclosing an SAE.**

## Software appeal

My wife and I began helping famine-stricken Ethiopia nearly two years ago, personally taking and distributing urgently-needed relief goods. What we saw shocked and disgusted us. We decided to continue helping and organised our voluntary work under the name You and Me. We then established a clinic in Sudan for Ethiopian refugees, together with an educational project and sewing and carpentry workshops. The clinic at present treats more than 1,000 patients every month.

Increasing paperwork, statistics of patients' illnesses, calculating the re-supply of medicines and equipment, caused us to think a computer would be helpful in maintaining our efficiency. In March, Sinclair Research donated a QL to us. Due to the Amstrad takeover, the QL arrived only recently.

Having finally received it, we now obviously need to gain maximum use of it. If any readers can help us construct suitable programs or help in any way, we would like to hear from them.

**Iain Scott,  
Highbrook Lane,  
West Hoathly,  
Sussex.**

## Fair gamble

Having noticed an abundance of Medic System cartridges for sale at radio rallies this year, I decided to buy one. At £30 the cartridge I bought, with 256K RAM and disc interface, seemed a fair gamble, as it was sold "as seen".

My initial test indicated that the cartridge was not working but after inspecting the circuit board I discovered that the supply rail was linked to the disc connector and, having changed the P9-P10 link to P8-P10 supplying the on-board regulator, things started to happen. At switch-on the monitor now displays Medic Disk System V1.13. 1984 and I believe the delay of the initial screen pattern indicates the memory is functioning. Abacus now displays 243K at start-up. Unused IC positions on the board suggest a possible expansion of a further 256K RAM.

Where can I obtain user information on the cartridge? Which disc drives are suitable for the cartridge? How are the disc socket connections arranged? Can the RAM be expanded. If so, how?

As I am a licensed radio amateur I would like to see QL Comms containing information on the radio

## Too pricey?

Can anyone tell me why the most useful programs for the QL are so very expensive?

In particular I refer to the two compiler programs from Digital Precision, *Turbo* and *Supercharge*, which sell at £84.95 and £59.95 respectively.

I would like to be able to compile my SuperBasic programs to make them run faster but there is no way I shall to spend these amounts.

I can understand that the software writers have worked long and hard to

communication properties of the QL. Home computers are very popular with RAs and the radio magazine publishers seem to overlook QL owners.

**S. A. Hall,  
Brighton.**

## In other words

Do you know where I can obtain a word processor for the Sinclair QL other than Quill? I wish to use foreign language fonts, with English, for translation purposes, displayed on the VDU and afterwards printed-out on a matrix printer using the appropriate commands and/or software.

I understand that Quill will not display foreign fonts because it draws on the ROM character set exclusively. My ROM is JM.

Unless you recommend otherwise, it seems reasonable to me to use the Saltigrades Font Editor for the font designs in conjunction with the word processor.

I need to intermingle English, Greek and Hebrew words and letters during translation.

**G. T. Morris,  
Sutton Coldfield.**

**Editor's reply: Try Tasman Software on 0532 438301 or QLANG, 50 Bankfield Drive, Bramcote Hills, Beeston, Nottingham NG9 3EG.**

produce the compilers but so have the writers of programs such as *Matchpoint* and *Chess*.

I can also see that if the compilers were used to produce a commercial program that Digital Precision should be entitled to a share of any profits. What about home computer owners who just want to make our programs run a little faster? Come on, software houses — give us a chance.

**Dene Fisher,  
Chorley, Lancs.**

**Editor's reply: Until recently Supercharge was the only compiler available for the QL which might account for its high price. Perhaps the introduction of competition in the form of Q-Liberator will lead to a reduction in prices. How about it, Digital Precision?**

## Technical guidance

I am writing to ask if you can inform me as to where can I find a book which contains an exhaustive description of Qdos and also, if it exists, such a thing as a description of the QL hardware.

Changing the subject, I want to congratulate you for the excellent magazine and would like to say to everybody reading it that our main mission is to prevent the QL dying.

I would like to know why, after spending hours writing and triple-checking, I still cannot get the Microdrive sector read/write extensions in the Jan/Feb issue, to work. I debugged it and found that when the program jumps to the Microdrive routine it returns 'Bad or Chan..AAgghh!'

**Jose Luis Martins,  
Damaia, Lisbon,  
Portugal.**

**Editor's reply: Try MPC Software on 01-804 8100. It sells the QL Technical guide at £19.95 and The QDOS companion at £6.95.**

# CHANNEL

## Mind your language

Would it be possible for you to carry an article (or several articles) in a future issue which compared the different languages available for the QL from the point of view of their suitability for certain tasks?

I have seen reviews of a number of packages; in each case the reviewer points out the merits of that particular software, often comparing it with other versions of the same language by other suppliers. That is, he answers the question — quite properly — How well does the product handle that particular language?

But for someone wanting to buy another language after Superbasic the first consideration should be; What is the type of work it is to be used for? For example, mathematical formulae or commercial-type programs? I understand that some languages are better for one job than for another.

May I suggest, then, that you publish an article on this. The best sort of article could be one made up of half-page contributions from several people: i.e. where a knowledgeable supporter of each of the possibilities available for the QL were to put forward the advantages of his language for particular tasks; i.e. someone for APL, another for BCPL, for C, Forth, Fortran-77, Lisp and

Pascal. Perhaps comparing each with what a QL user will already know, about Superbasic. Let them put forward a competitive case in public.

Of course, this sort of information is not specific to the QL; but it is very much the specific kind of advice one needs to have before buying a second language package.

**E Palfrey,  
Cookham,  
Berkshire.**

*Editor's reply: We are, as they say, looking into it. Thanks for the suggestion. Does anyone else have suggestions for future articles? Write and let us know.*



## Repairing the wheel

I purchased my QL last Christmas and until about a month ago it performed very well. There was an occasional failure when compiling large programs, but then mdv1 started to fail consistently after a few minutes' operation.

I sent back my QL to Sinclair under warranty and it was promptly returned unopened and still faulty. At

that point I decided to look more closely at the problem.

Looking inside the QL it was obvious what was wrong. The little rubber drive wheel on the Microdrive had crept up on its drive shaft, resulting in inadequate contact with the Microdrive cartridges. Pushing it back down cured the problem. All is well again.

**Phil Johnson,  
Stoke-on-Trent.**

## Minor Surgery

Thank you for your article QL Surgery in the September issue. I am interested particularly in the two-way expansion box with separate power supply referred to in the concluding note on page 9. It would be appreciated if you could let me have the name and address of a supplier for this item. I have an expansion module at the moment but after a short period of use my QL, which is otherwise very satisfactory, hangs up.

**G. Burnett,  
Larkhall,  
Lanarkshire.**

*Editor's reply: Try CST on 0438 352150.*

## Discovery

I have found a new SuperBasic keyword: "MISTake". Can you tell me how to use it and what its use is, as nothing is mentioned in the User Guide?

**Paul Edney,  
Servion,  
Switzerland.**

*Editor's reply: MISTake indicates a syntax error while loading. If you attempted to run the program you would, theoretically, get an error message.*

## Service with a smile

So often we read complaints from people who have bought items of hardware, and on discovering problems have great difficulty in getting things rectified.

I bought a PCML expansion card from Eidersoft at a show last year. Some months later I called in at PCML to look at disc drives.

After a cup of tea, I was taken into the factory to see them being assembled. I decided to purchase a dual drive, and was allowed the purchase price of the expansion card against it.

A week or so ago I had a problem with the disc drives and called back to see PCML for help. "If you can wait a few moments, we will have a look at it for you" was the first comment, followed by a cup of tea and a magazine to browse through. The drive was out of guarantee by two months and I expected to be given an estimate for repairs and a time to pick them up.

About 10 minutes passed when an engineer came to me with the drives, as I thought, having being repaired.

"Seems to be a power snag", he explained, "so take this new set". They were brand new. I said I would return them as soon as mine were repaired but he would not hear of it.

"If you have any more trouble, call in", was his reply. This treatment is not all that common these days and after the worry of my discs failing was much appreciated. I would be very grateful if you could find time to pass this information to other readers. It may give some of them a lift, to know that good service is still available.

**I W Chick,  
East Molesey,  
Surrey.**

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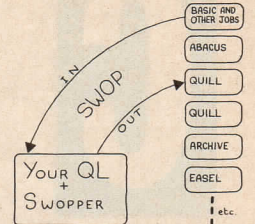
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VISA AND ACCESS WELCOMED



**M**any of the Technical Help letters which arrive at the *QL World* offices relate to the use of the *QL* in some kind of control work. People, it seem, want to control their train sets, input monitoring signals from greenhouses, collect and send RTTY signals

some fairly technical ground initially. If you want desperately to design your own cards at some stage, you will need to understand something of what is happening. As the series progresses we will see this technical theory being used to create a two-part multi-purpose input/output card system called *Qontrol-II*. It will

board. Other input/output cards will then slot into this baseboard. The first input/output card we design will have a Centronics-compatible parallel printer interface, 24 digital input/output lines, two special control lines, two programmable timer/counters, a programmable shift register, and eight fast A/D channels which can

ROM containing control extensions to SuperBasic and an equivalent library of routines for the assembly language programmer. We are negotiating with a number of interested parties for the manufacture of the boards. In that way everyone can use controllers without having to worry about making

# QL CONNECTIONS



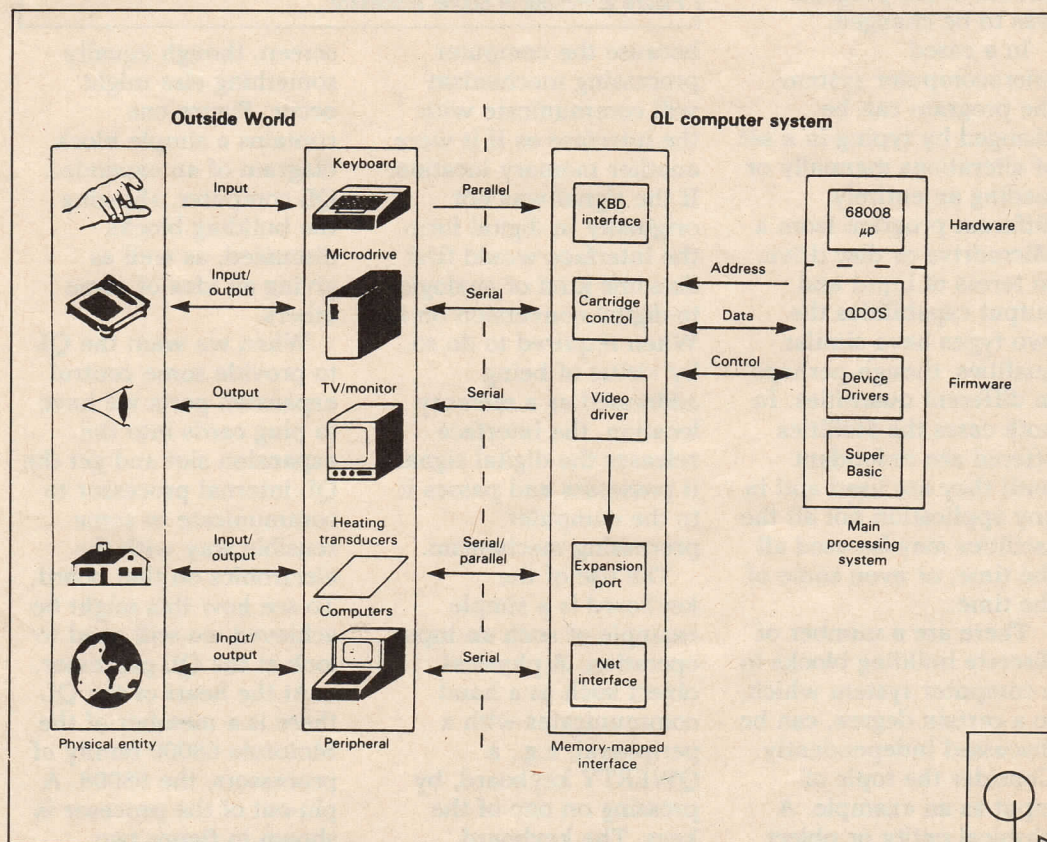
round the globe and so on. That is all very well but for two problems. First, the *QL* has no reasonable facility for such control or input/output operations. Second, the level of experienced readers is about as diverse as the applications themselves. If you are interested in control but have little programming or hardware design experience, you will probably not want to have to learn how to build your own input/output interfaces, or delve into assembly language. More appropriate to your needs would be a well-defined and versatile input-output card with an accompanying Control SuperBasic. Alternatively, you may be reasonably experienced in electronics and 68000 family assembly language programming. Your requirement is for a thorough, yet concise, technical description of how external devices or peripheral cards may be designed and attached to the expansion interface of the *QL*. So we offer a series of articles to cater for everyone's tastes. In this mammoth attempt at getting you to control your train sets or whatever, we will cover

This article by Colin Opie marks the start of an ambitious attempt by *Sinclair QL World* to provide a complete guide to *QL* interfacing techniques. Whatever you want to hook to your *QL* we aim to show you how. You need not be a technical wizard to manage it.

fit into the *QL* expansion slot found on the left-hand side of the *QL*. The first part of the control system is an address decoding and signal synchronisation

be switched to suit the input requirements of dual analogue-type joysticks together with buttons. Cards designed for *Qontrol-II* will hold a

cards first. Before we proceed further, let us look at some very basic ideas about using micros for control work. A microprocessor-based system consists essentially of some input electronics, the microprocessor, some output electronics, and a stored program. Such is the common use of this technology that chips — or more formally integrated circuits — known as microcomputers are



manufactured. The microcomputer chips have a certain amount of input and output capability and program memory built into them, along with the microprocessor electronics. Clearly there is a saving in cost because only one chip is being used rather than a series of chips. The overall size of a controller design is also reduced.

It may be that you have only encountered the term microcomputer when it has referred to a plastic or metal-cased computer system. The QL microcomputer is an example of this kind of computer. In a global sense there is no difference between a microcomputer chip and a boxed microcomputer, although a number of distinctions can be made.

With the microcomputer chip the program normally is entered into the chip at the time of its manufacture — called mask programming — and therefore a second production run would be needed if the program was to be changed.

In a cased microcomputer system the program can be changed by typing-in a set of alterations manually or loading an entirely different program from a Microdrive or disc drive. In terms of input and output capabilities the two types have similar qualities, though perhaps in different quantities. In both cases the facilities offered are redundant until they are used and in any application not all the facilities may be used all the time, or even some of the time.

There are a number of discrete building blocks in a computer system which, to a certain degree, can be discussed independently. Consider the topic of input as an example. A physical entity or object

will communicate in some way with a peripheral device. That peripheral will convert the physical entity into some form of electrical signal and pass the signal to a memory-mapped interface, which in turn will store the signal.

The interface is classed as memory-mapped

senses the action and sends a parallel digital code to the keyboard interface electronics. The code is then collected by the computer processing system and used accordingly.

One effect might be than an echo of the alphanumeric character appears on a television

From a software point of view the 68008 is a full 68000 implementation. Its major difference is that the device package is similar and caters only for an 8-bit data bus.

The descriptions which follow relate to the processor signal pins shown in figure two. Only a relatively brief description is given for the signals but, nevertheless, a description to suit our needs. For a complete and thorough treatise of the 68008 processor, reference should be made to Motorola documentation. All the signals are brought out to the QL expansion connector, so that highly-advanced applications may be designed if required — e.g., second processors. A convention used when discussing the signals is that the letter 'L' is appended to all names of signals which are active low — e.g., the 68008 DTACK signal is shown as DTACKL.

Address lines A0-A19 are the 20 output address lines used to address the HB of memory. The memory address range, therefore, is \$00000 to \$FFFFFF. Peripheral expansion boards on the QL must lie within a 16KB block in the memory address range \$C0000 to \$FFFFFF (i.e., the top 256KB, as shown in figure three. Note that the two expansion I/O areas between \$10000 and \$17FFF, and \$1C000 and \$1FFFF, are reserved areas and must not be used. The address lines are uni-directional tri-state.

Data lines D0-D7 are the eight bi-directional lines which are the data transfer lines. The data lines are tri-state.

Status lines FC0-FC2 are three output status lines supplied by the 68008 to inform external circuitry of the current status of the machine

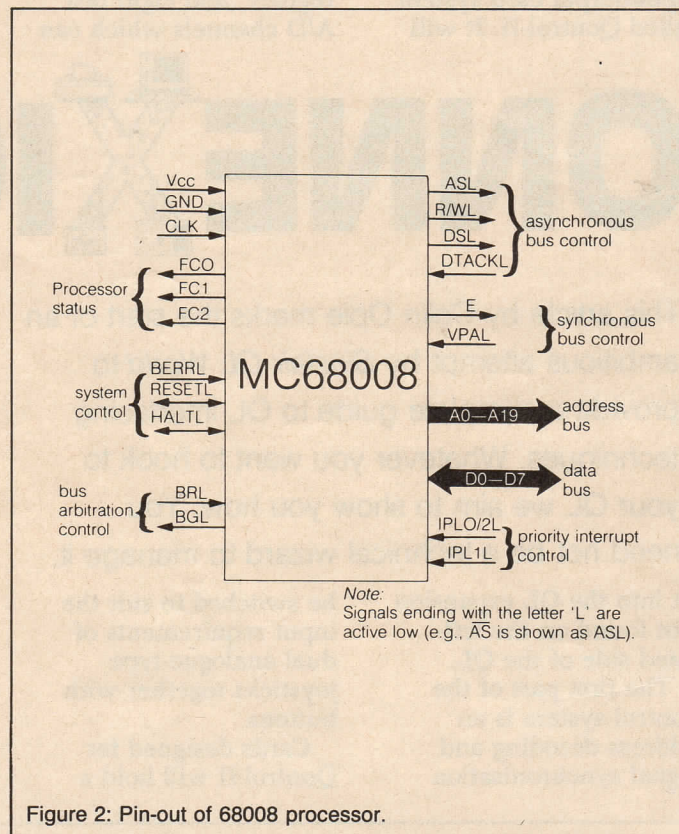


Figure 2: Pin-out of 68008 processor.

because the computer processing mechanism will communicate with the interface as if it were another memory location. If the signal was not originally in digital form the interface would first do some kind of analogue-to-digital conversion on it. When required to do so, by virtue of being addressed as a memory location, the interface releases the digital signal it possesses and passes it to the computer processing mechanism.

The use of the keyboard is a simple example of such an input operation. A physical object such as a hand communicates with a peripheral, e.g., a QWERTY keyboard, by pressing on one of the keys. The keyboard

screen, though equally something else might occur. Figure one contains a simple block diagram of an expanded QL computer, showing the building blocks discussed, as well as giving an idea of some others.

When we want the QL to provide some control expansion ports we have to plug cards into the expansion slot and get the QL internal processor to communicate in some sensible way with the electronics on that board. To see how this might be achieved we will need to look at the QL processor.

At the heart of the QL there is a member of the Motorola 68000 family of processors, the 68008. A pin-out of the processor is shown in figure two.

**Table A.**

FC0	FC1	FC2	Use
0	0	0	Reserved (undefined)
0	0	1	User data memory access
0	1	0	User program memory access
0	1	1	Reserved (undefined)
1	0	0	Reserved (undefined)
1	0	1	Supervisor data memory access
1	1	0	Supervisor program memory access
1	1	1	Interrupt acknowledge

cycle. Their use can be seen in table A.

The 68008 can operate in either user mode or supervisor mode.

Whenever the processor is collecting instructions a program memory access is being made. All other types of memory access are data memory accesses. Those outputs are uni-directional tri-state.

Asynchronous bus control signals — ASL, R/WL, DSL, DTACKL. The address strobe ASL is put into its active state — i.e., low — when a valid address exists on the address lines A0 to A19. The R/WL — read/write — and DSL — data strobe — signals are used to signal the fact that a valid byte of data exists on the data lines D0 to D7, during a read or write operation, as in table B.

**Table B.**

DTACKL	DSL	R/WL	Use
x	0	0	Valid data, write cycle
1	0	1	Request read cycle
0	0	1	Valid data, read cycle
1	1	x	Invalid data

The data transfer acknowledge input — DTACKL — is slightly misnamed. When the input is active it signifies to the processor that the asynchronous data transfer operation may go ahead. DTACKL should be made inactive — i.e., high — as soon as the data transfer operation is signalled as being complete by ASL or DSL becoming inactive — i.e., high. The three output signals — ASL, R/WL and

DSL — are tri-state.

Synchronous control signals E, VPAL are the two signals used by the 68008 to enable synchronous operations to take place with devices which require it — 6800/6502 peripheral chips. Note that the 68008 does not have the 68000 VMAL line and that must, therefore, be generated externally by additional circuitry — the VMAL line is used for chip select conditioning. The signals will be discussed more fully when we consider 6800 peripheral device addressing later. The E signal is an output — clock — signal, and VPAL is an input signal.

Interrupt control lines IPL0/2L, IPL1L make up the priority interrupt input status for the processor. The 68008, because it ties the 68000 IPL0L and IPL02 lines, can have only priority interrupt levels 0, 2, 5

and 7. Of these, level 0 signifies that there is no interrupt pending and level 7 is a non-maskable edge-triggered interrupt.

These two input interrupt lines exist on the QL expansion interface but they are not used as the external interrupt source for the appropriate physical layer access vectors within device drivers. A separate expansion bus line EXTINTL is provided instead. It is normal

practice, therefore, to tie the IRQL outputs of 6800 peripheral chips to the EXTINTL line and get the physical access layer interrupt service routines to respond appropriately.

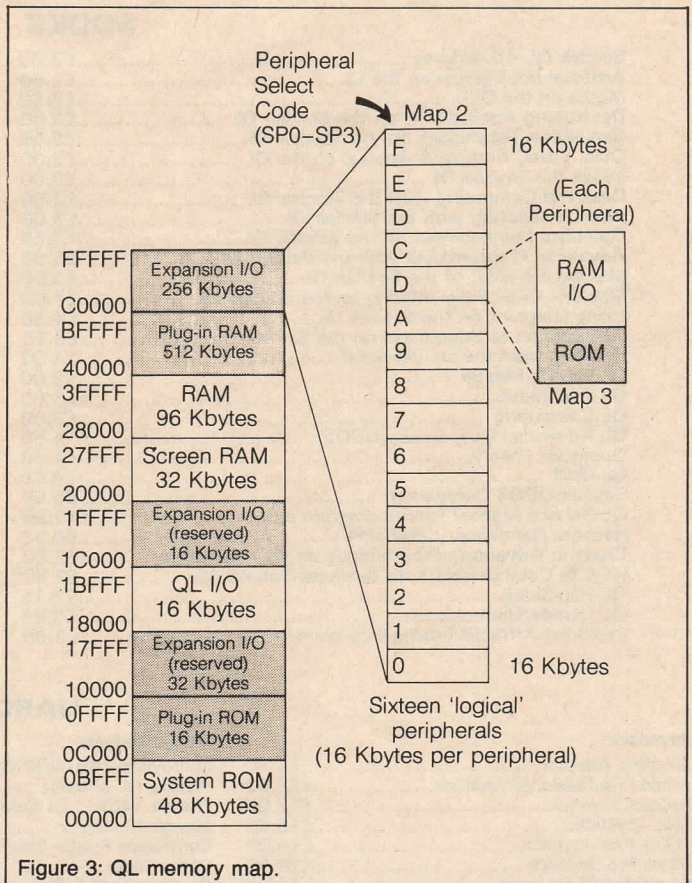
The 68008 IPL0/2L and IPL1L lines will be used only in exceptional circumstances, in applications where external circuitry is willing to take control of the whole bus system.

Bus arbitration control signals BRL, BGL provide a mechanism for networked bus masters. A bus master is any device which can take control of the data, address and control buses and use them intelligently. They

signify to the other possible masters that it will relinquish control of the bus at the end of the current cycle.

System control signals BERRL, RESETL, HALTL are rather specialised. The bi-directional HALTL signal is the input line to halt the processor and the output line to inform external circuitry that the processor has stopped. It is not provided on the QL expansion bus. The bi-directional RESETL line is used for re-setting the processor, or external devices.

On the QL expansion bus this signal is replaced by the purely output signal RESETCPUL, used



**Figure 3: QL memory map.**

would be used only in complex multi-processor or DMA applications.

The input — bus request — is tied to all devices in the system capable of being bus masters. Any device may assert this line to inform the current master that it wants to take control of the bus. The output BGL — bus grant — is asserted after the request, by the current bus master, to

by the processor to re-set external devices when the 68000 instruction RESET is executed in a program. Finally, the BERRL input signal is used by external circuitry to inform the processor of a hardware malfunction during a cycle execution.

*Next month we look at QL processor addressing operations and the expansion port connector.*

# MPC SOFTWARE

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This book is essential reading if you are interest in programming the QL in machine code. It describes all the features of QDOS, and gives details of all the TRAPs, and Vector calls. It includes details on how to access the keyboard, screen, serial ports etc. from machine code, how to communicate with the 8049 co-processor, and how to write multi-tasking programmes and lots more. ..£6.95

### QL Service Manual

The QL Service Manual is the book issued by Sinclair Research to QL Repair companies, and contains all you need to know about the QL Hardware. It has full circuit diagrams, including the Micro-drives, details on the various chips and their function, block diagrams, details on how to repair the QL, and the components used and lots more .....

### QL Games Compendium

This book by Tim Hartnell contains listings for over 20 QL games/leisure programmes including: Eliza (In which you QL can carry on a conversation with you), Qthello, Magicians Maze, Detective Q, Stockbroker, Tryst with mephistopheles, QL Racer. It also contains details on how the games work, and on how to write you own programmes for the QL .....

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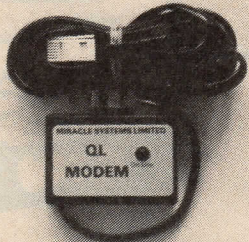
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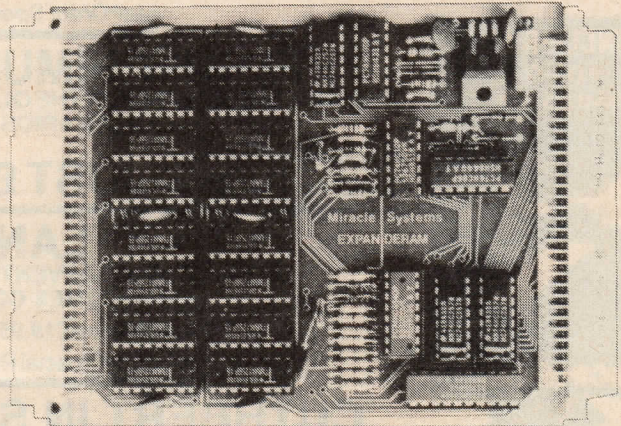
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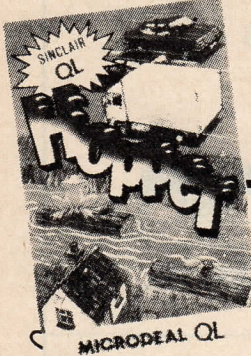
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# Link-Up

**W**hen Psion launched the Organiser II in July, we were particularly impressed by its specification. At that time it was suggested that if suitable software became available, the Organiser could materialise as the ultimate QL peripheral. We were scarcely sticking out our necks. The striking resemblance between Archive and OPL, the language of the Organiser, was bound to prove an irresistible temptation.

Two companies, Eidersoft and Transform, have taken the bait and the result is two markedly different approaches to the same problem, that of transferring files between the Organiser and QL.

Both packages require the Psion RS232 interface. A lead is supplied, at one end of which fits the 25-pin D connector of the RS232; the other terminates in the familiar BT socket which plugs into one of the serial ports. Before use, the baud rate and communications protocols must be configured using the Set-Up option from the Comms menu. There the similarity between the two packages ends.

*QL-Organiser* by Transform is supplied entirely on a single Microdrive or disc. On loading the Boot file, the QL displays the seven main menu options — Organiser to QL file; QL file to Organiser; Organiser to printer; Mail list to Organiser; Install procedures on Organiser; QL files to screen/printer; delete QL files.

Those are for the most part fairly self-explanatory. The first option allows files or procedures to be transmitted from the Comms menu. The information can be sent directly to a Microdrive file, or displayed on-screen during copying. Each record is displayed on a separate line, with fields separated by what to the Organiser is a TAB, but to the QL is, unfortunately, a block graphic. If you find it annoying you could always translate it to a space — ASCII code 32 — in the Set-Up option.

Aside from the file transfer facilities the program offers a number of procedures for use with the Transform Archive-based *Mail List* program. First the procedures must be copied across, a process which, in my case, was rather tedious, since each file needed two or three attempts before the software at either end of the lead

was satisfied that the data had made the jump.

Once the procedures are installed, you can transfer exported Mail List files into the organiser. The Mail List-to-Organiser option allows transfer of complete files or individual records. The additional procedures enable you to Find, Add, Update, Print and delete records. You can also jump to the first or last record in a file.

By comparison with QL-Organiser,

**The Psion Organiser II has carved its own distinctive niche in the world of portable computers. Linked to a QL its potential expands to new limits.**

## INFORMATION

### QL-ORGANISER

Includes QL lead, software on Microdrive or disc and manual.  
Price £39.95

### TEXTBASE

Includes QL lead, software on Psion datapack and manual.  
Price £44.90

Psion Organiser RS232 interface.  
Price £47.95

Transform Ltd  
24 West Oak  
Beckenham  
Kent BR3 2EZ  
Tel: 01-658 6350

Eidersoft Ltd  
The Office, Hall Farm  
Church Lane  
North Ockenden  
Upminster  
Essex RM14 3QH  
Tel 0708 852647

*Textbase* from Eidersoft is a very large and sophisticated piece of software. *Textbase* is a complete Organiser database. Eidersoft also produces *Numbase*, a similar procedure for collection and analysis of numeric data.

As with any database, it is first necessary to set up a format file — define fields and so on. There are two useful default fields, Datestamp which obtains its input from the clock automati-

cally and Barcode, which waits for input from the barcode reader.

*Textbase* provides a top-level menu which is operated in the same fashion as other Organiser menus. The available functions are: Input, Find, Edit, Display, Files, Label, Print, Off, Mode, Erase and Quit.

Most of the procedures are implementations of the functions you would expect to find on any good database.

The Find option provides a powerful record search facility. Either a text match can be provided or you can search for a particular bar code, using the reader to input match data. The software will look for records containing all or any one of six match words.

Selection of the Files option from the main menu takes you into a sub-menu providing what could loosely be called file housekeeping functions. From there it is possible to copy, delete directory, re-name and export your *Textbase* files.

Aside from the file transfer programs, there are two more procedures which will prove very useful to the pocket database manager. Labels allow you to design the format of address labels, store the design for later use and print-out selected records from a file in that format. The print option is really a hard copy version of Find, selected records being output to the printer.

The Export procedure already mentioned allows transfer of *Textbase* files into Archive. A short Archive procedure listed in the manual provides for file transfer in the opposite direction. Details are provided for sending other types of file from the QL to the Organiser. It is also possible to transfer both procedure and program files in both directions, either into Quill — for easy editing — or into SuperBasic.

In its favour is the fact that the Transform QL-Organiser costs slightly less than *Textbase*. You could also argue that all of the *Textbase* procedures should be implemented on the QL once a file had been transferred. Transform is also working on enhancements to the program. The latest version will be QLiberator-compiled and will include an Organiser to Archive and back facility. If the ability to transfer files is the major consideration, QL-Organiser would be a good basis on which to build.

Having said that, given the choice, I would opt for the Eidersoft system. *Textbase* has to be the best, and possibly only 'proper' database for the Organiser. If you want to use the system in a professional business environment, the bar code and date-stamping facilities could be essential.

# SOFTWARE FILE

If you want to avoid playing Scrabble with the relatives this Christmas there is just time to pick up a seasonal software offering. Ron Massey looks at what is available.

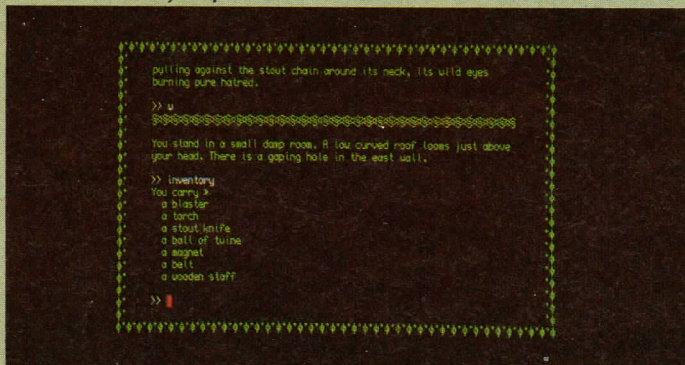
## Nemesis

Talent  
£14.95

Text games, unlike their more visual counterparts, have a fascination arising from a wider scope of scenarios from which to construct coherent story-lines. Limited only to the imagination of their authors and not being tied solely to the manipulation of visual effects, text games can include many puzzle elements not available to other methods of game writing.

Substantially improved over the original version independently released by the author in early April of this year, the Talent version of *Nemesis* completes a hat-trick for its text-only games series and shows the polish for which Talent has gained

*The substantially improved Nemesis.*



its reputation. The loading screen is superb and makes me wish that the remainder of the game was similarly illustrated. After the loading screen sequence is completed, you are offered the options of playing either part one or part two of *Nemesis*.

Selecting the part one option, the scene opens

with, "You are standing at the helm of the small landing port that transported you down to the planet's surface from your orbiting ship." So begins an adventure fraught with danger and action. Part two starts at an advanced stage of the game, with a more complete inventory of possessions.

The flow of play throughout *Nemesis* is smooth and engrossing. *Nemesis* is written in the tradition of a good role-playing novel; obstacles have a realism which left me with a feeling of *déjà vu*. Response vocabulary is very good, although, if you wish to have an inventory of your current possessions, "inventory" must be typed in full; only a few of the other responses suffer similarly. Movement directions

through the game, however, can be input either in their full spelling or by their initial.

Although not an integral part of the game package, Talent is also offering an audio cassette of excellent original music written by the author of *Nemesis*, to provide additional atmosphere.

## Ambition

Care Electronics  
£29.95

A superb and highly attractive business strategy game, *Ambition* incorporates all of the fascinating quality of *Monopoly* without the inherent unfairness of opponents occupying prime positions early in the play.

A game for four players, or teams of players, everyone starts on an equal basis having a £30,000 home — on which a second mortgage is available — and a £40,000 float.

*Ambition* begins on New Year's Eve 1984. Play occurs at weekly intervals covering a 28-year period and incorporates virtually every real-life condition in which various aspects of fate are taken into consideration such as the effect of the weather on buying and selling, elements of choice and stock market trends.

Turns of play do not necessarily occur in strict order but reflect elements of luck and opportunity found in real-life conditions. The die is regulated by a sophisticated algorithm which produces exact and accurate odds over the complete period of play. Generally, high throws tend to be to your advantage and will give favourable weather and stock market conditions, and an improved board position on-screen.

Six alternative starting points, each of which

gives similar modes of play but from different perspectives and levels of risk, are available. Novice levels incur no deducted living expenses; alternatively, players will have £4,000 plus an annual increment deducted from their bank accounts. Costs are offset automatically by the game 'accountant' by any amount acquired during the current 'year' of play.

You are then offered the second option of either starting the play or of choosing either intermediate, giving you shareholdings, two land sites and five loads of marketable consumables in each of the five price groups, or Expert, allowing you to build a portfolio of any combination of business shares and land sites, up to a value of your £40,000 float.

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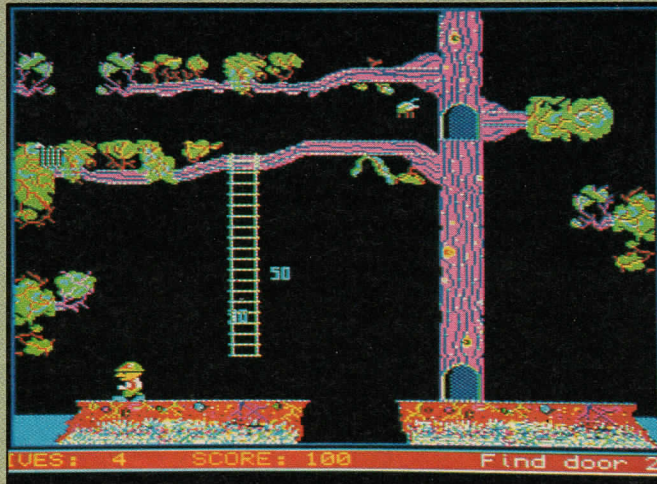
Reports are available at any time during your turn, indicating nett worth, available commodities, operating costs, and stock market reports providing both predicted and actual share prices. Elements included in the play provide a range of contact with real world situations. Developing land requires obtaining a land site, necessary building materials, liaison with builders and contractors

# Jungle Eddi

Talent  
£14.95

A second superb arcade game from those talented Talent people for light relief over the long winter months, *Jungle Eddi* includes the best features of an outdoor maze and elements of risk to sustain your interest.

Two levels of play are provided as the initial options which determine the speed of character movement and your reaction time. Local scenery and background throughout the game occurs in a hundred smoothly-changing, random obstacle layouts — no two successive



*Jungle Eddi. To jump, or not to jump?*

games are exactly the same.

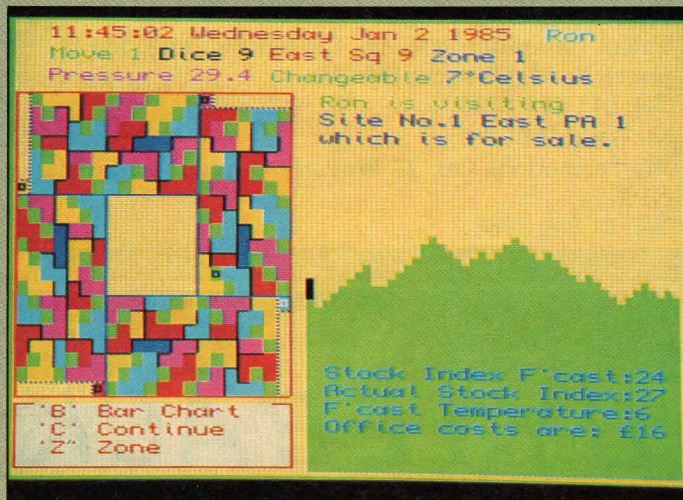
Well-balanced in terms of action, risks, elements of judgement — to jump or not to jump — and movement options, you have opportunities of

gaining lives as you, in the tradition of Tarzan, jump from ground to branch or through the trees to capture the flying hearts. At the same time you must avoid poisonous snakes, scorpions and tortoises, or falling to your death into crevasses or drowning in the evil,

smelly marshes.

Points are gained by capturing flying bells, numbers and pigmy stickmen versions of Tinkerbell, or is it Peter Pan? If Eddi is on the ground, he can be killed by greenfly or, if he jumps, the greenfly are worth 200 points. Pinkfly can either push you to your death or cause you to jump.

Although not particularly demanding, *Jungle Eddi* is delightfully replayable and successfully achieves an atmosphere lacking in the excessive seriousness attempted by some writers of games of this genre. The graphics are well-planned and sustain player interest. Definitely the kind of game to play when you have 10 minutes to spare.



*A cold day in the land of Ambition.*

and planning permission from 'local authorities'.

A pleasant surprise is the attention to the fine detail throughout the program. If you are using an expanded QL a second boot program is provided which can utilise a RAM disc for rapid loading of files and saving of the game at any point.

On-line help, related to the option chosen at any particular point of play is available, such as confidential screen reports concerning your current holdings and financial position — make sure your opponents are not looking. Prices for the various consumable raw materials are realistic and give *Ambition* a feeling of

authenticity usually lacking in other similar computer or board games.

The screen weather report — affected by both dice throw and season — indicating the effect on buying and selling inclinations of the general public has been derived from Meteorological Office records covering a 30-year period in the Oxford area.

*Ambition* is a massive program written entirely in machine code. Described justifiably in the detailed documentation as user-friendly, every conceivable aid is included throughout for both running and playing the game.

# Mr. Smith

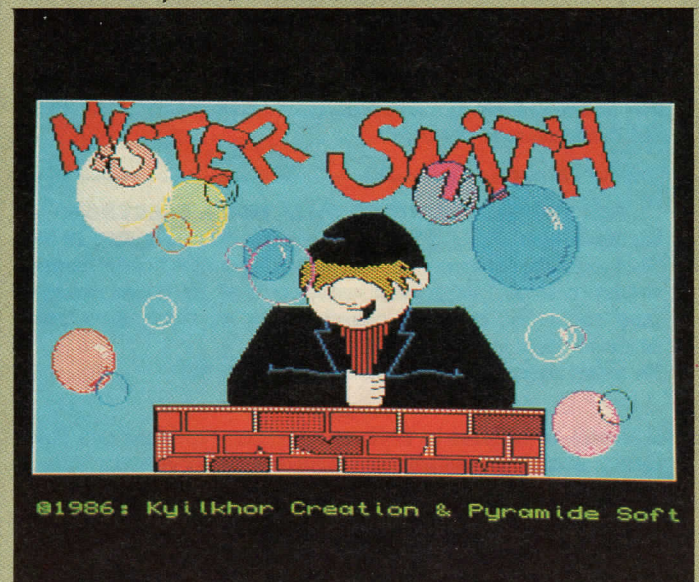
Pyramide  
£14.95

*Mr Smith*, a new release from Pyramide, has become available just in time for prospective Christmas shoppers. When up and running, you are presented with a menu of obstacles and conditions under which it

is possible to gain points. Trouble, resulting in the loss of one of your lives, occurs in the form of matrons, the neighbourhood young woman or the milkman.

With sprite characters looking like something taken from Andy Capp, you are presented initially with 50 brick wall obstacles behind which you can dodge or hide

*Mr Smith. No prizes for the haircut.*



# SOFTWARE FILE

while, at the same time, trying to avoid eyeball confrontations with the neighbourhood matrons, one of which, presumably, is your wife.

The neighbourhood young woman, incidentally, is a cross between Dolly Parton and Jimmy Durante. I will leave you to draw your conclusions about her appearance.

The next screen invites you to type-in your name and to select one of the four levels of play. Your name appears in the table of high scores at the end of the game, which can then be saved to a drive. Curiously, I saw no way for the score to be re-loaded into subsequent plays.

During the play, a unit of brick wall disappears at the rate of one section

every two seconds and re-appears in random positions once every three seconds. That will be of some help occasionally, as the obstacle will prevent the advance of the dreaded matrons. On the other hand, obstacles can also block your line of retreat.

When the game screen starts, five matrons appear from randomly-located doorways, as is the manner by which you make your appearance — or re-appearance, if you run into trouble.

At random intervals during play you have the option of collecting the odd pint. That will re-set the screen timer and extend your period of play opportunities. You can gain extra lives for every 30,000 points.

The internal structure of the game appears much

like the intelligence logic Eigen incorporated in its *Gobble Gobble*, in that the QL matrons hunt down the hapless Mr Smith in almost direct response to his movements. My only objections to the manner in which the play is presented is that, being weighted in favour of the

matrons, you have too little chance to escape when playing at level one.

Confrontation can also occur on contact of either the top, bottom, sides or corners of the sprite. Allowing corner contact of the sprites in this type of game eliminates almost all possibility of escape. Other than these two relatively minor points, I felt that Mr Smith was delightfully replayable.

## Information

Ambition £29.95.

Care Electronics, 800 St Albans Road, Garston, Watford, Herts WD2 6NL.

Tel: 0923 672102.

Jungle Eddi £14.95.

Talent Computer Systems, Curran Building, 101 St James Road, Glasgow G4 0NS.

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Talent Computer Systems, Curran Building, 101 St James Road, Glasgow G4 0NS.

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## WDSoftware

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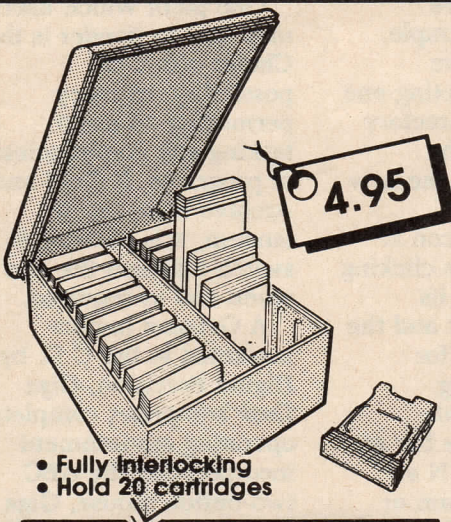
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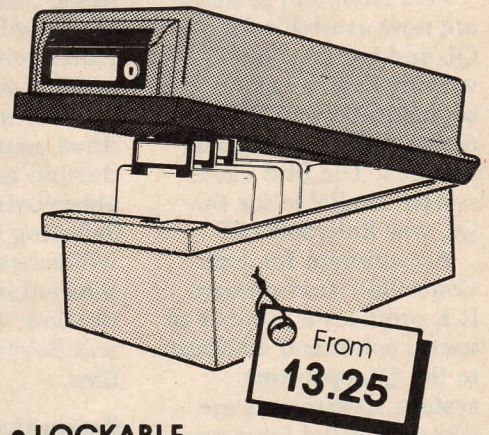
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Focus On

# FRONT-ENDS

Since we last looked at Front Ends — software to make computing simple — two new systems have appeared and another is on the way. Ron Massey lines them up.

Getting to grips with the QL, the more common commands associated with directories, copying, running and editing programs or other similar repetitive operations is not difficult; it is more a case of the repetition rapidly becoming time-consuming and boring.

A front end, simplifying command input, and often including features not otherwise readily available to a basic operating system, has become an expected feature on more expensive machines.

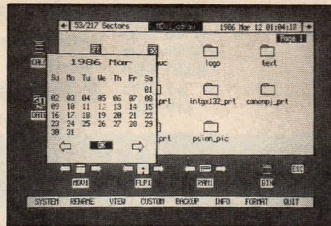
Macintosh, one of the best examples of a well-designed system, has established an industry standard for its GEM front-end input systems and relies entirely on a combination of icons and pull-down menus.

Five front-end systems are now available for the QL and incorporate varying degrees of sophistication and occasionally overlapping features. The first such system available for the QL was Eidersoft ICE.

An acronym for Icon Controlled Environment, ICE provides a number of useful command additions to the QL operating system. Commands are cursor-selected from one of the 13 screen icons or from the menu line at the bottom of the screen and are entered by single or double clicking the space bar.

When the QL is first switched-on or each time it is re-set, you have the option either of defaulting to the ICE screen or, if the ALT key is held down

until the Sinclair copyright logo appears, initiating a boot program or going directly to the default input windows, after pressing F1 or F2. A single new keyword has been added, via the EPROM, to SuperBasic — ICE. When invoked, the now familiar ICE page is returned to the screen directly from SuperBasic or the default screens.



ICE

The ICE screen consists of an icon for each of the main drive options, Microdrive, floppy and RAM disc, each of which is central to two arrow icons. Selecting either arrow will enable you to increment the drive number to be accessed.

Other symbols on the drive control row are a dustbin and an abbreviation for escape. Selecting the ESC symbol will cancel any files selected in the directory window; the BIN icon will delete any selected files.

## Command inputs

Near the upper left corner of the ICE screen, an icon labelled "CALC" accesses the ICE simple five-function calculator. If selected with the screen cursor and spacebar, a window opens in the centre of the screen containing a graphic representation of a calculator.

Below this is another icon, labelled DATE.

Accessing this icon produces a calendar in the conventional format which can be paged through successive or preceding months.

Directory icons are, wherever possible, related to the type of file to which they relate. Boot or files suffixed with -bas are labelled "SB", Archive files are represented by a two-drawer filing cabinet, Abacus files are represented by an abacus, executable files are labelled "EXEC". Other file types follow a similar convention.

Multiple command inputs are interactive in that a succession of icon selections will follow through a sequence of commands. Once the directory icons are available, for example, changing the drive number and selecting one or more of the directory icons will copy the selected items to the new drive number.

If a directory icon is selected by single clicking of the space bar, its colour will invert and the system will wait for further processing commands. Double-clicking the space bar at an icon will LRUN a SuperBasic program or EXEC-W a machine code or compiled file.

Further strengthening the similarity between ICE and GEM, Eidersoft offers a version of ICE incorporating a three-button mouse. Complementing its ARTice graphics program, the mouse replaces all

cursor key and space bar functions.

Where volume directories are large, as is usually the case with disc directories, selecting the screen paging option, after obtaining the first page of 12 directory icons, pressing the right-hand mouse button will advance the count four pages at a time.

Adding further versatility to the ICE system, Eidersoft supplies a suite of programs called CHOIce. It provides an additional range of individual utilities for operating a RAM disc, mail-merging — combining a group of otherwise identical documents, each individually addressed or otherwise personalised — or printing labels.

One point which users may care to ponder is that Choice offers the possibility, memory permitting, of multi-tasking any combination of programs. If Quill and Archive were run in tandem, it is possible to switch between the two when and as required.

A German import marketed in the U.K. by Digital Precision, Giga Desk comprises complete operating environment incorporating the ABC two-button mouse, Giga Basic (EASE) and the Giga Desk software.

Giga Desk consists of what is becoming a conventional icon/menu screen, from which you can eliminate the bulk of keyboard inputs for file-handling and other repetitive processing tasks. Icon options enable



you to alter the default sizes of the various windows available to the system, to move them round the screen or to pan and scroll within the windows.

An interesting feature of the GD directory system is that, once you have your initial directory, which defaults to icons, you have additional options of sorting the initial display by alphabetical order; file size or date; or annotating any number of individual file entries with an indexing marker and doing additional sorts.

The DESK option accesses the almost mandatory calculator — this one uses RPL notation, but includes trig, log and memory functions — a tile game (!), an option called Panel

and a final option called "About E.A.S.E."

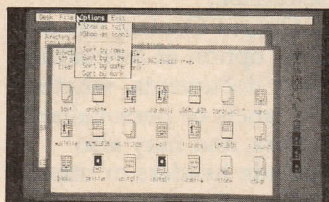
Expecting a help or prompt page, I selected the "About E.A.S.E" option and had, instead, a copyright message. As that is a repeat, more or less, of the start-up message, I felt that it was somewhat less than helpful and something of a waste of valuable coding space.

The PANEL option accesses a number of commands relating to the display. You have options of selecting either high- or low-resolution modes, setting the drive defaults for either Microdrives or a disc station, printer port assignment, and scrolling or panning steps.

Curiously, Giga Desk is not particularly fast. More to the point it lacks much of the smoothness of

other similar OL utilities. In this respect, it is consistent with Giga Chrome.

The remainder of the system, E.A.S.E.,



E.A.S.E.

furnishes the functions of a toolkit and adds a number of useful commands to SuperBasic. Also included is a system for producing sprites. They may be incorporated into games or used as animated icons.

A newcomer to the front-end scene and an acronym for QL Applications Traffic Supervisor, the Cope Software QATS is exceptional in that its menu system is entirely user-definable. Operating in a menu tree structure, you have the option of customising any number of front ends for particular applications, each with its own distinctive command structures.

Supplied with the main operating system either on an EPROM or as multi-tasking software, the system is installed in modules by connecting system services when and as required. A semi-intelligent system, when QATS is loaded, it will look at the peripherals attached to your system and, when the first screen asks for the drive on which the other coding is placed, the list of drives will contain entries for 'mdv' and, if available, 'flp' and 'ram'. Drive numbers are next selected from a similar parameter.

When up and running, the first menu will contain items pertaining to primary options. Since they are re-configurable, examples used in describing them will be taken from the system as

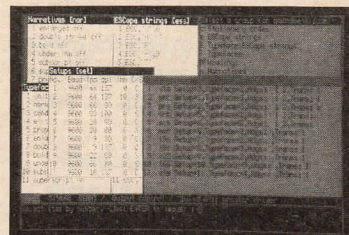
supplied with the review copy of QATS.

Menus and windows are re-positionable and sizes may be changed to suit particular requirements, either temporarily or as default sizes and positioning. Each successive menu is numbered, indicating its position on the command tree. Successively, the main menu is headed by "1 START"; the next, by "2 Name selected from first menu", as well as the invisible command attached to it, and so on downwards.

If "P Psion" is selected, the first sub-menu will contain the names of the Psion programs and their relevant input letters.

Since I always run other jobs alongside Quill — Keydefine, the Qlone clock, and a Caps Lock indicator — I re-configured the Q Quill option from the Psion menu to produce another sub-menu, rather than starting Quill immediately. In that way I have the option of starting from any number of different Keydefine programs, according to the type of work I am doing.

An option recently added to the QATS system allows you to teach it the series of keypresses required to



QATS

produce a "learned" sequence of command inputs.

When start-up commands are attached to particular menu options while configuring the system, you have the further option of running them either as

Option	MOUSE ICE	QATS	GDESK	QIMP
Code Source				
EPROM	Yes	Yes	No	No
mdv or disc	CHOice	Yes	Yes	Yes
Command Input				
Keyboard	Yes	Yes	Yes	Yes
Cursor keys	No	No	No	Yes
Mouse	Yes	No	Yes	No
Menu	Yes	Yes	Yes	Yes
Icon	Yes	No	Yes	Yes
Recall	Yes	No	No	Yes
Method	'ICE'	Reload services	—	<CTRL>
Display Options				
Chg Wind. size	No	Yes	Yes	Yes
Config colour	Yes	Yes	Yes	Yes
Config menus	No	Yes	No	No
Windowing	Fixed	Config	Config	Config
Drive Options				
No. support.	8	All	All	All
mdv	Yes	Yes	Yes	Yes
Disc	Yes	Yes	Yes	Yes
RAM disc	Yes	Yes	Yes	Yes
Hard disc	No	Yes	No	No
Files				
Indication	Icons	Names	Icons	Icons
Directory	Yes	Yes	Yes	Yes
Sort	No	Yes	Yes	No
Re-name	Yes	Yes	Yes	Yes
Wildcard	No	Yes	No	No
Back-up	Yes	Yes	Yes	Yes
Information	Yes	Yes	Yes	Yes
Memory				
Access	No	Yes	No	Yes
Edit	No	No	No	No
Dump	No	No	No	Yes
Program				
Start	Yes	Yes	Yes	Yes
Interrupt	No	No	No	Yes
Re-start	No	No	No	No
Output				
Copy	Yes	Yes	Yes	Yes
Format	Yes	Yes	Yes	Yes
Print to screen	Yes	No	Yes	Yes
printer	Yes	Yes	No	No
print codes	No	Yes	No	No
BAUD rate	Yes	Yes	Yes	Yes
Screen dump	No	No	No	No
System				
Job control	No	Yes	Yes	Yes
Job Info	Yes	Yes	Yes	Yes
Clock cont.	Yes	No	Yes	Yes
Misc Options				
Calendar	Yes	No	Yes	Yes
Calculator	Yes	No	Yes	Yes
Diary	No	No	No	No
Notepad	No	No	No	No
Print-code library	No	Yes	No	No
Mail merge/other formatted output:	CHOice	Yes	No	No



background jobs — EXEC — or as a foreground job — EXEC\_W. Job priority is also installed at that time.

File-handling, connected with the COPY, DIRECTORY and DELETE commands, includes a powerful wildcard filter allowing you to extract a group of filenames and process them as a group. The conventional wildcard utility seen in the majority of similar utilities will extract from a directory all occurrences of *boot*, where it may be followed by an "\_". If the wildcard option is input as "\_ \_boot", it will extract all occurrences of *boot*, *\_boot*, or *\_boot\_*.

One of the most impressive QATS options is its Output Control module. In common with

attached to each function — the first for initiating a sequence — condensed typeface, for example — and the second for switching-off the sequence.

Output Control has a final option of formatting your documents, whether for labels or personalised letters, and may also include headers or other information common to a group of documents.

Personalised mailing lists may be made up from Archive name and address records and attached to a Quill \_lis document.

Perhaps old-fashioned in the sense that option selection is not available with the presently-fashionable icons, QATS includes some of the most exciting and useful features I have seen in a single program system.

Icons are placed vertically on the left side of the screen for two Microdrives, two floppies, one RAM disc and a multi-purpose BIN. Main menu headers, FILES, DESK, WINDOWS and OPTIONS, select any one of the sub-menus with a relevant command list.

## Windows

Calling for a directory, the main window size defaults to eight icons but can be re-defined to full screen windowing for up to 15 icons. Other features in the QIMP system include a SuperBasic program or file editor; output device control; a VIEW option — similar to the COPY TO SCR command; programs may be started from within QIMP by using the INIT CODE command in the OPTIONS sub-menu.

One important point mentioned in the documentation is that control will return to QIMP in some cases by pressing the <CTRL> <ALT> <7> key combination but this combination will not work if running programs which re-direct traps and exceptions.

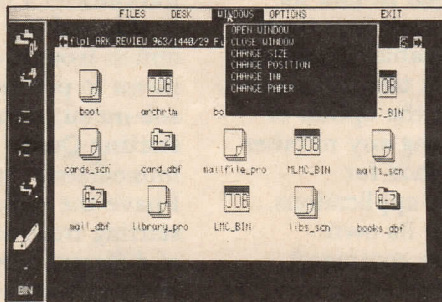
Consistent with other Talent software, QIMP is a very useful utility.

While perhaps not so extensive as other similar programs, it offers a number of powerful facilities in a very user-friendly environment. One of the surprising features, more for its limitations than for its inclusion, is that, with the exception of QATS, these systems have included such a simple calculator representation option.

The only calculator worthy of the name I have ever had the pleasure to review was a part of the Eigen icon control program *Paragon*. Eigen calculators were user-selectable from either a conventional simple four-function calculator or a full-feature scientific version, available in either of two configurations.

Not being one to submit willingly to boringly repetitive typing, each of the systems reviewed has its own advantages. EPROM-based systems, such as QATS or ICE, are always on-line, whereas device-based programs require loading before they are available.

In that respect, QATS has a decided advantage in that it can be used either way. That will leave the sole QL ROM port available for other utilities such as toolkits.



QIMP

## QIMP — QL Icon

Manager Program — from Talent is similar to ICE in that it uses a combination of icons and pull-down menus to access system commands. Memory requirement for the program is about 28K of resident procedure area. Although intended primarily for use with expanded QLs, QIMP, provided users remain acutely aware of memory restrictions with regard to the number and size of windows used at one time, should provide no problems for enjoying the benefits of its simplified command inputs. In common with other systems using this type of menu selection, the majority of the commands are input using cursor keys and space bar.

the rest of the system, Output Control — OC — may be re-configured, either temporarily or permanently, to your exact requirements and provides a comprehensive system for controlling the output of your QL to any legitimate device.

Up to 256 commands may be attached to each of a similar number of printer character "Translate" options. This feature will enable you to produce graphic, or other special characters, with a single character entry into, for example, a Quill \_lis file.

Every command available to your printer, or other output device, is attached to two menu pairs — a function list and the relevant control code

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<b>QIMP</b>	£34.95
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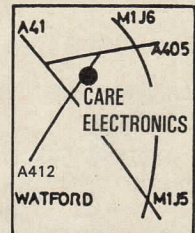
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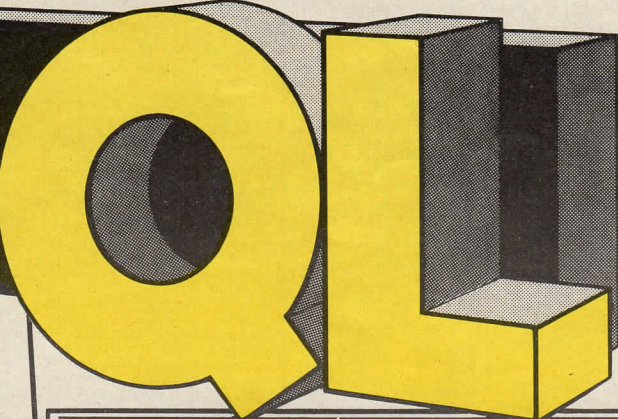
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NEW

# DIMENSIONS

Our May report on CAD software speculated on the probability of the QL offering 3D design capabilities. Ron Massey examines two packages fulfilling the prophecy.

Two extremely exciting products, which made their debut at the ZX Microfair, are now available to provide technical and artistic illustrators with powerful tools to add new dimensions and depth to their drawing.

Written in compiled SuperBasic, *Concept 3D* employs three basic types of model representations for drawing — free-form models, cell models and surfaces of revolution. Mixtures of the three types in any combination may be made as required.

Free-form models are drawn in 3D space by connecting points and lines manually. This technique is used for three-dimensional artistic drawing where there is no other way to model an object.

Cell models consist of a series of two-dimensional polygons wherein the QL connects the vertices. A simple example of cell modelling may be seen in a perspective or isometric representation of a cube. Cell modelling and a number of minor variations is the method most commonly used to draw.

Cell models may have constant cross-sections — such as occur in a cylinder — or variable cross-section, such as a ship hull or aircraft fuselage or wings. The third representation, surface of revolution, while managed by the QL processing in the same way as cell modelling, is created by repeating elements common to any particular shape.

An example given in the *Concept 3D* manual examines the construction of a wine-glass drawing. Lines were first drawn along the side co-ordinates. Setting-up the drawing parameters, QL processing projected co-ordinates round a pre-determined central axis.

If a cube is viewed from its front surface, the x axis occurs from the front to the rear of the cube; viewing

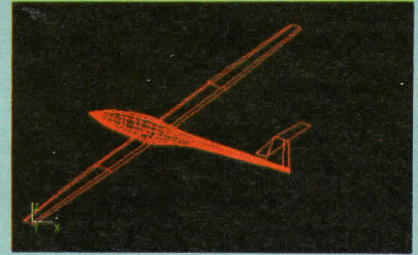
the cube from the side, the y axis assumes the same orientation as does the y axis when viewing the cube from its top surface.

When constructing or viewing a model on the *Concept* screen, relative x, y, z global co-ordinate positions are indicated in the lower left corner of the screen in the orientation in the drawing. Colour-coded the lines are green where the axes occur either parallel to the screen or from monitor rear to front. Red indicates an axis viewed from front to rear of the monitor.

Two methods of screen cursor movement are available; selecting one

of 1 to 9 number keys will move the cursor by the selected number of pixels. Alternatively, the cursor may be moved to a specific x, y, z position by entering the relative co-ordinates.

Models may be scaled for either drawing or viewing. The system de-



*Concept 3D*, user-friendly design.

faults to a value of one and the scale figure refers to pixel values. Scale values may also be established by incorporating a constant based on measurements for particular output devices.

Other powerful options include a rubber-band line for previewing a drawing element prior to committing it to the model. *Concept* will also accept inputs with mathematical operators. Elements may be "undone" or, if deleted by mistake, may be re-called, provided no new elements have been added prior to recall. Rubber-banded auto-geometry for box, circle, arc and lines have been implemented.

Up to 34 characters may be input at any time and printed on the screen at the position of the cursor defining the upper left corner of the first character.

When a model is complete, it may be viewed as a wireframe model or as a surface model. Rotation of the model in any orientation may be made by direct entry of relative x, y, z co-ordinate placement.

Other viewing options include the selection of WINDOW. This will effectively set the viewing distance and is the *Concept* implementation of zoom. Defaulting to a value of one, entering a five, for example, will produce a 1/5th scale model; .25 will produce a four times magnification.

File-handling includes options for Directory, Load and Save. Models may also be merged from a number of other model files and will occur at the current cursor position. Each model is

Comparative features of QL 3D Modelling programs	
CONCEPT 3D	
Drawing method	Continuous, co-ordinate or pre-programmable.
Definition modes	4 or 8, switchable within program.
Colour range	0 to 7
Method of selection	Menu/colour wedge.
Command access	
Menu	Yes
Icons	No
Method of entry	Keyboard
Help pages on screen	No
Aids: Border reference	Yes
Grid — on select	No
Cursor co-ord indicator	Yes
Prompt window	Yes
Image pan/scroll	Yes; at cursor position.
Element move/reposition	Yes
Image magnification	Yes; zoom function.
Auto mirror image	No
Pen direction indicator	No
Stretch/compass	No
Drawing tools:	
Pen	No
Width control	No
Brush — sizes	No
Airbrush	No
Auto Fill — on select	Yes; in surface modelling.
Erase	Yes
Drawing modes	
Pen off	n.a.
Pen on	n.a.
XOR	No
Cursor on screen	Yes
Control	Cursor keys; direct x,y,z address.
Movement	1 to 9 pixel increments.
Turtle graphics	No
Type	' + '
Auto colour change (re-colour)	Yes
Auto geometrics	
Rubber-banding	Yes
Circle	Yes
Ellipse	Yes
Arc	Yes
Box	Yes
Triangle	No
Others	Expand 2D shapes into 3D; auto surface of revolution, hidden line, and surface removal, perspective. By plot.
Line: length	
Width	
Element movement	Yes; points and lines.
Element duplication	Yes; models.
Auto shadowing	No
Text	Yes
Modes	Standard QL.
Colour	Standard colours.
Sizes	5
Positioning	At any time in display mode.
File control	
Directory	Yes
Load a screen	Yes; files may be merged in a single screen.
Save a screen	Yes
Delete a file	Yes
Format media	No
Printer dump	Yes
Area printed	Full screen; area of drawing selected by pan and zoom.
Demo pics supplied	1
Principle application	Technical and artistic 3D modeling; 3D conceptual design and visualising.

saved as two separate files, one suffixed *-cd* for co-ordinate file — and the other *-md* — for models.

The first Rubicon venture into QL utilities, *Viewpoint* is written in assembler and incorporates powerful professional features required of a 3D modelling program. Conscious of efficient memory management, the Viewpoint system stores two vertices every time a line is drawn. In a completed model any stored vertex may have several lines emanating from it.

More useful in many ways than the more conventional text help pages, a demonstration mode has been included for viewing and experimenting with the effects of moving the axes and a similar demonstration for a cube.

## Other options

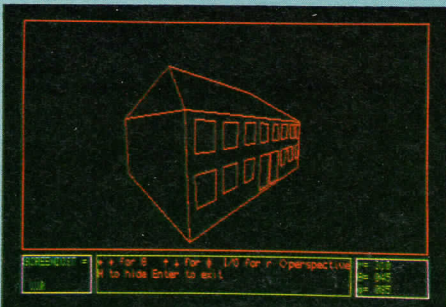
Switching between modes 4 and 8 occurs within the program. Rubber-banded auto-geometry includes options for lines — drawn between two points determined by the cursor — and a sphere — a circle, viewed in three dimensions.

Other rubber-band options include circle — may be drawn in perspective on the x-y plane; rectangle, box — drawn in 3D, to the specified height, width and depth; polygon — up to 10 sides — requires that a face be parallel to an x-y, y-z or x-z plane.

Screen aids include the option of a grid which may be superimposed on the cursor plane; image mirroring is available about the x-y, y-z or x-z planes; the screen cursor may be re-centred with a single keypress.

A SEARCH option has been implemented and will sweep a 9x9 pixel area for a vertex. The JOIN option will join two vertices, identified by number — available from the drawing data list tables.

An option for deleting the immediately previous operation is available;



Viewpoint in perspective.

once accepted into the drawing store, by pressing any key other than the <D>, the operation becomes a permanent part of the drawing.

In common with all good computer practice, users are urged to save drawings at regular intervals. Where expanded memory is available it can be

### Comparative features of QL 3D Modelling programs

	VIEWPOINT RUBICON
Drawing method	Co-ordinate, plot.
Definition modes	4 and 8; switchable within program.
Colour range	0 to 7, relevant to mode.
Method of selection	Menu
Command Access	
Menu	Single command letters.
Icons	No
Method of entry	Keyboard
Help pages on screen	Yes; two active models.
Aids: Border reference	No
Grid — on select	Yes
Cursor co-ord indicator	Yes; x, y, z.
Prompt window	Yes
Image pan scroll	Yes
Element move/reposition	Yes
Image magnification	Yes; zoom option.
Auto mirror image	No
Pen direction indicator	No
Stretch/compress	No
Drawing tools	
Pen	No
Width control	No
Brush — sizes	No
Airbrush	No
Auto Fill — on select	Yes; for surface modelling
Erase	Yes
Drawing modes	
Pen off	n.a.
Pen on	n.a.
XOR	No
Cursor on screen	Yes
Control	Cursor keys.
Movement	Relevant to scale; two speed.
Turtle graphics	n.a.
Type	' + '
Auto colour change (re-colour)	Yes
Auto geometrics	
Rubber-banding	Yes
Circle	Yes
Sphere	Yes
Ellipse	Yes
Arc	Yes
Box	Yes
Triangle	No
Others	Continuous perspective changes.
Line: length	Yes
width	No
Element movement	Yes
Element duplication	No
Auto shadowing	No
Text	Yes
Modes	4 and 8
Colour	0 to 7; related to mode.
Sizes	Standard QL font.
Positioning	At current cursor position.
File control	
Directory	Yes
Load a screen	Yes
Save a screen	Yes; may be used in Basic programs.
Delete a file	Yes
Format media	No
Printer dump	Yes; reconfigurable.
Area printed	Whole screen; defined by zoom option.
Demo pics supplied	4
Average no. files/cart	120
Principal application	Technical and artist drawing program; 3D conceptual design and visualising.

done using RAM dis, thereby saving wear and tear on the drives.

A highly-flexible system of viewing position selection has been incorporated in the Viewpoint system. Users have the option of rotating the model in five- or 15-degree increments on any of its axes, wherein the model is re-drawn for each increment.

Alternatively, if <CTRL> is pressed and model movement keys are selected, the co-ordinates clock through successive positions. Once the required position is obtained, pressing <SPACE> will cause the model to jump directly to the new orientation. Either method will produce rotation about the relevant axis.

Both viewing position — effective distance from the model — effectively a zoom option, and perspective may be incremented as required. Extreme perspective from any viewpoint is available and is indicated numerically in a separate window next to the command line.

A number of superb demonstration files have been included with the viewpoint program and illustrate its capabilities aptly. Two-dimensional images, as viewed on-screen, may be saved in a number of consecutive files of 4K each for inclusion in separate SuperBasic programs by utilising the Viewpoint LOADER routine. Hidden lines, however, will not be represented.

LOADER adds a new function to SuperBasic, allowing the user to re-draw a model by using the CALL pic,n command, where n is the file number. The Viewpoint manual is exceptionally well-planned. A number of practical tutorial examples and tips have been included. Recommendations are made regarding use of the program and general computer useage.

Concise instructions are included for customising the Viewpoint printer dump for non-Epson-compatible dot matrix printers.

One point covered in the manual, frequently overlooked by both beginner and experienced computer user alike, is that prior to beginning a drawing session, users should plan carefully what they are attempting to accomplish on paper.

## Planning

Users obsessed with speed will appreciate the fact that the entirely machine code Viewpoint is the faster of the two but, considering three-dimensional modelling requires particular care and planning if a drawing is not to dissolve into a collection of disjointed geometry, speed is of relatively little importance for any application other than re-drawing a finished model. In this respect, the compiled Concept 3D is more than adequate.

While Concept 3D is marginally more user-friendly, Viewpoint incorporates a number of professional illustrator's features. Even more unusual, both programs are supplied with superb manuals, each including a useful range of examples and detailed information. Overall, both programs will find particular applications and have individual appeal to individual methods of drawing.

## Information

### CONCEPT 3D

Tesseract Software Development,  
2519 Bishop Avenue, Fremont,  
California 94536.

Available from most good dealers

### VIEWPOINT

Rubicon Computer Systems, 11  
Bannerdale Road, Sheffield S7  
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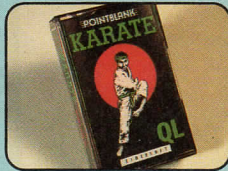
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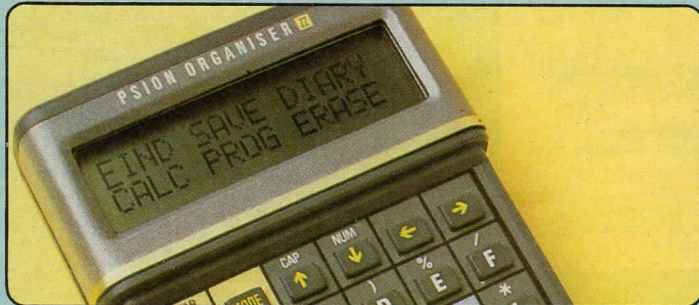


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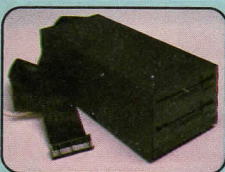
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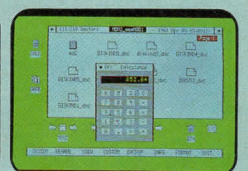
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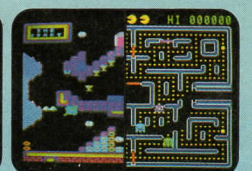
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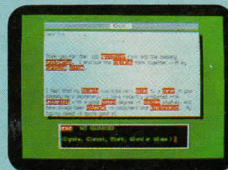
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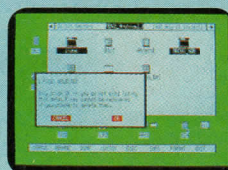
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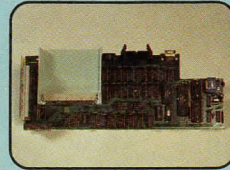


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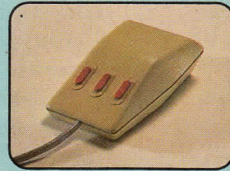
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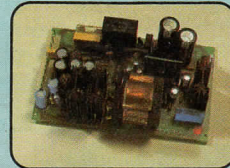
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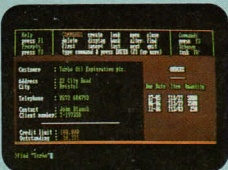
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commands including cell protection and titles command. In Archive the USR function allows you to link in machine code routines, and the SEDIT command offers improved screen designing. Easel includes the famous 3D bar graphs to give your presentations that professional polish.

**THOR PC SYSTEM SOFTWARE**

Included with the Thor is an improved version of the ICE computer front end, that allows simple housekeeping to be achieved by the use or mouse or cursor. Built in screen dumps by QDUMP DANSOFT allow you to snapshot the screen at any time to the printer or a file. A much enhanced operating system gives you menu control, single key task switching between Xchange and other tasks (including Superbasic) and extended windowing capabilities.

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# GRAPHIC TOOLKIT Pyramide £14.95

QL toolkits are becoming an increasingly more common way of supplementing the outstanding attributes of SuperBasic. Polarising towards particular specialisations, toolkit users are provided with a wide range of useful services not readily available by other means.

If you are contemplating writing a program, either professionally or for particular personal *Graphic Toolkit. Slick and professional.*



applications, in which sophisticated graphics will play an important part, and require functions and procedures for extending the range of commands available to your system, the Pyramide *Graphic Toolkit* may be what you have been seeking.

Adding 77 new keywords to the QL repertoire and pertaining mainly to graphics handling, *Graphic Toolkit* includes very powerful commands, a few which include:

**Screen manipulation:** New functions and procedures to provide additional facilities to your programs are available for the direct manipulation of QL characters, direct inter-conversion of decimal and hex values, for adding a 16x magnification

window, display mode control — colour and flash suppression options — controlling the screen cursor and obtaining a return of its position. Similar to the *QJump* command WTV or WMON *Graphic Toolkit* has a direct command, SETWIN n, which will allow you to set any one

of six window layouts with a single command.

**Keyboard management:** Important routines have been included to improve program control for data response or access and allow you to enable or disable cursors in defined channels or to enable or disable the break function.

**System management:** Improvements to program flow and the QL operating system are available for preventing program crashes because of non-existent devices or files, an improved PAUSE which suspends the operation of a program for the specified period — one of the compilers will speed a PAUSE by a factor of about 20 — a software re-set of the QL, QL system information, a

# UTILITY FILE

protection system which ties back-ups to master cartridges and checks for the presence of the master in an assigned drive.

Other routines for manipulating words or blocks of memory provide useful methods of allocating or releasing memory space in the common heap, obtaining the size of the largest contiguous block of free memory, storing a compressed screen image in memory. Keywords for handling QL hardware are available and provide functions for suspending programs while drives are operating.

Although the *Graphic Toolkit* package contains superb features, I feel users should have the option of being able to link as many or as few individual routines as required. Comprising some 11K of machine code, there is always a possibility that users could find their QLs may be working very close to memory capacity, if they are using a 128K machine and large programs.

Having said that, however, the same observation applies to virtually every major toolkit available for the QL and, with a little care, the size of the toolkit should present no real hardship, especially when the benefits available from the extra commands are taken into consideration.

*Graphic Toolkit* represents very good value; by linking a small amount of extra SuperBasic, it is possible

Whether you want Christmas cards, or on-line programming help, *Utility file* has it all. Ron Massey reports.

to write a complete specialised graphics program with the machine code routines supplied by Pyramide. Very much up to the standard set by other Pyramide graphic products such as *QL Peintre* and *Nucleon*, *Graphic Toolkit* is an invaluable aid for providing a slick, professional finish to any program.

## Various Utilities Breakthrough software £7.50 each

An established publisher, Breakthrough Software supplies several programs at very reasonable prices.

*Spooler:* Ultimately, file-handling is what computing is about. Multi-tasking, *Spooler* enables you to move files to and from any legitimate QL device — printer, drive, network, modem or screen.

Loosely speaking, spooling is similar in effect to the process produced by the copy command with the distinction being that copying becomes a background operation instead of occupying the QL time exclusively. That can be demonstrated if, when asked for the spooling destination, you input con.

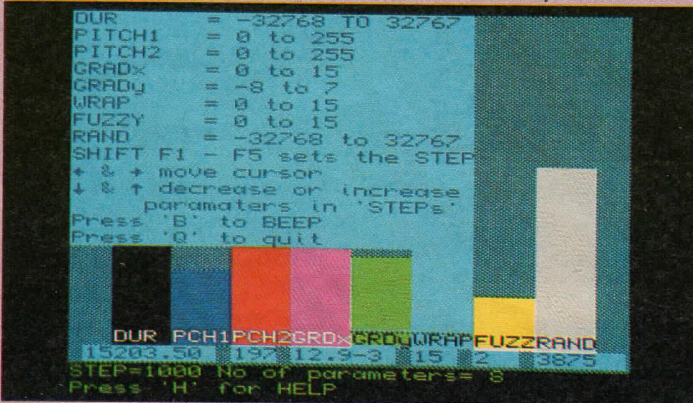
While the file is being copied to the screen, the cursor will be returned to your control. If you then input copy device filename to scr, the copy command will take



precedence until completed, after which spooling will continue.

**Snapshot:** One of the less-desirable aspects of Basic programs is that loading can take a considerable time. While this routine will not increase the running speed of a SuperBasic program, it will reduce the time taken to load it dramatically. Typical loading times for even very large Basic programs is in the region of 15 to 30 seconds.

*Breakthrough's on-line manual demonstrates the beep command.*



Programs are processed by this routine so that, in effect, a snapshot of the interior of the QL is saved as a tokenised file, alleviating interpreter processing of the program as it loads — this is the reason why drives continually start-stop.

It is recommended that Snapshot is used to process completed programs. While fast-load programs can be listed — only after they have been loaded, copying such programs to screen or to a printer directly from a drive will produce machine code-like file representation — each modification to a program will require that a new Snapshot file is made each time a listing is edited.

One of the important points, carefully highlighted in the documentation, is that the process of making fast-load programs makes all of the peripherals attached to your QL an integral part of the new

file. When running the re-structured file, the same peripherals must be present, whether or not they are used or the system can return an error message.

Programs should be produced on a clean machine — i.e., the basic 128K QL — and can be run subsequently with whatever add-ons you normally have available.

**Real Windows:** A machine code program which adds three commands to Basic for

window management. Once installed, memory is reserved when an area of the screen is over-written and is recalled when the new window is closed.

**On-Line SuperBasic Manual:** Although all the programs released by Breakthrough are useful utilities, for my money this is its *piece de resistance*. In spite of the fact that the original User Guide is one of the better computer manuals, it often leaves much to be desired in the way of clarity. On-Line is a small multi-tasking program which runs unobtrusively in the background.

Once the 1K program has been executed, QL keyword files can be accessed, as needed, from mdv2\_ by pressing <F1> and inputting the appropriate keyword. A general help and index page is available by typing "HELP".

A very well-planned program, On-Line includes a number of

useful demonstrations associated with some of the more esoteric commands; the BEEP demonstration, to name one, is one of the best I have seen. Associated keywords are cross-referenced.

Very good value, Breakthrough has accomplished its goal of providing inexpensive, highly useful and easy-to-drive programs admirably. Included with each of its programs are file items which include a very useful last-line recall function, a high-res screen dump and a range of useful machine code extensions. Very highly recommended.

## GIGACHROME Digital Precision £34.95

The latest ABC Electronic release for QL graphic artists, *Gigachrome* has opted for the Macintosh-type approach to drawing, with command options available from icons and pull-down menus. A number of useful controls have been included in the operating system, enabling you to get into computer art with a minimum of effort.

The first screen allows you to set the system for use either with mouse or joystick/cursor keys. If the system is set for use

impossible to position accurately from the keyboard.

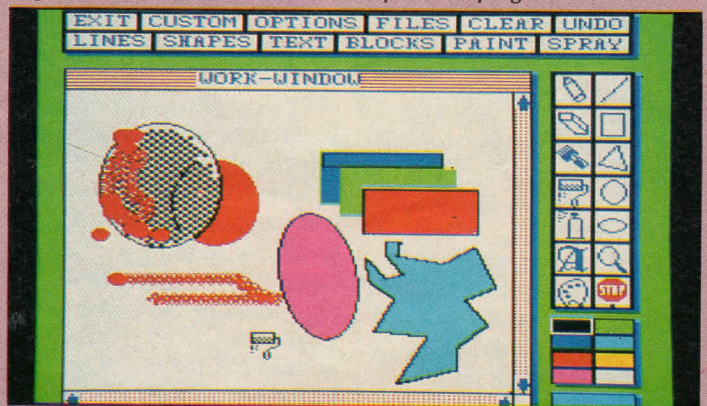
Line drawing may be done in either the continuous drawing mode or in the radial mode, where lines radiate from a common point. Painting has nine brush options; spray has three distinct patterns. The spray density, incidentally, is limited to variations from one of three spray patterns and lacks a realistic random dispersion.

The system includes several good character fonts for use in drawings. Unfortunately they are embedded in the program code and, except for inclusion in screen dumps, are not accessible from outside the system.

Paper colour is selected from two columns of colour wedges; ink is selected from a separate page, after clicking at the icon representing the artist's palette. In addition to the range of solid ink colours, you have the option of selecting any one of 16 pre-drawn patterns; having selected one of them, you also have the option of editing them. The range of standard QL stipples does not appear to be supported.

Rubber-banded shapes may be filled automatically if the fill option is selected from

*Gigachrome has the feel of a slow SuperBasic program.*



with a mouse, cursor speed is increased dramatically and the screen cursor is almost



the command menu prior to drawing the shape, or the paint roller icon can be selected for filling existing shapes. The latter option allows you to have different border and fill colours.

If the enclosure you wish to fill is very small, however, the upper left corner of the roller must be located in the enclosed area. If that critical corner is outside the area, you will have a filled screen instead. Fortunately an UNDO option is available from the command menu. The UNDO option, however, also has the strange effect of deleting all of the fill accomplished during any single use of the facility.

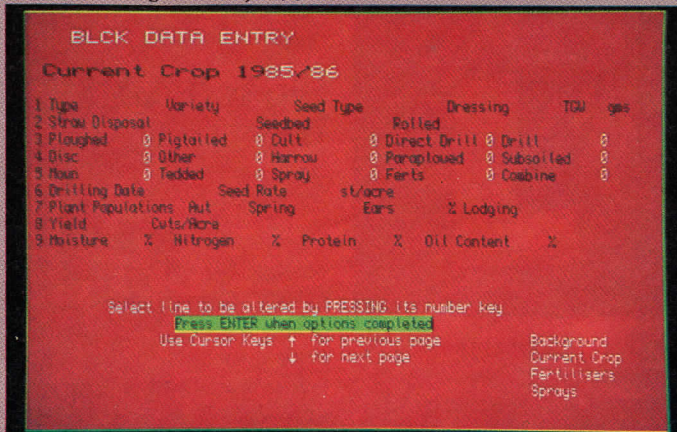
Curiously, Gigachrome is the first QL graphics program requiring a minimum of 128K of additional RAM. If for no other reason, that should have allowed the authors to include considerably more features and with a better implementation than is the case. When up and running, the program has the feel of a particularly slow SuperBasic program.

Although the icons are reasonably clear as to their function, they lack the fine-tuned feel of similar graphics programs and appear clumsy to use. Part of the difficulty with untidy icons lies in the program restrictions for use in mode 8 only.

For the price, and considering the many other graphics programs available for the QL, I would have expected something offering better value. Although the Gigachrome system would appear to be intended mainly for use with either mouse or joystick, cursor keys can be used for drawing. Drawing with the cursor keys, however, is slow and the cursor had the annoying habit of either flickering or disappearing temporarily.

## BUDGET SLAVE £125 RECORD SLAVE/ HOUSE SLAVE £125 Slave Software

Modern farming techniques are highly complex and require close monitoring if production targets are to be maintained. Yet again highlighting the diversification of programs available for the QL, highly-specialised releases by Slave Software *Software that grows on you, from Slave.*



are provided as farming application aids.

*Budget Slave* is designed to allow farmers to obtain a quick and accurate financial assessment of their business, along with the resulting cashflow projections.

Cashflow information may be generated in three ways — data entered into either the crop planner section or the Fixed Cost Planner; or from direct entries to the cashflow.

Crop planner caters for 20 crop varieties and the information is used to produce a gross margin and provide updates for cashflow headings. Data input for the fixed cost planner may be entered under any of 30 headings nominated by the user. Fifteen sub-headings are available to each main heading.

The cashflow section has 35 headings which

may be split, as required, between income and expenditure. In the majority of applications, allocation between each is automatic. Direct entries, however, may be made where items of income or expenditure are not part of either costs or income relating to crop production or fixed costs.

*Record Slave/House Slave* provides a crop record for eight years. Incorporating data of up to 20 crop types, up to 50 chemical and brew types, crop rotations, all organised by field names — which can be added to or sub-divided — records

## UTILITY FILE

field history.

There are 47 headings for each field. The fertiliser page accommodates seed-bed fertilisers along with five separate headings for top dressings; the spray page allows for 18 different chemicals to be applied to each field. Five crops may be included in each rotation, covering a maximum eight-year crop history.

Designed for simplicity of use, Slave programs, with the exception of data inputs, are mostly menu-selected and single-key entries. Users can edit or accept existing entries as default values; saving new entries can occur at any time during the running of the program. Reports may be printed at any stage. Also program configurations are available for arable and non-arable applications.

One of the main features of Slave software is that, although the programs submitted for review were representative of its range, inherent flexibility of the Slave system enables individual users to have customised software applicable to their particular working conditions. Also included in the program price is a very good, comprehensive back-up service.

### Information

Pyramide. Rio Promotions Ltd, 28 Waverly Grove, London N3 NPX. Tel: 01-349 2764.

Slave Software. The Old Rectory, Thurlton, Norwich, Norfolk NR14 6RN. Tel: 050 846 8866.

Breakthrough Software. 17 Shaftesbury Way, Royston, Herts SG8 9DE.

Digital Precision, 222 The Avenue, London E4 9SE. Tel: 01-527 5493.



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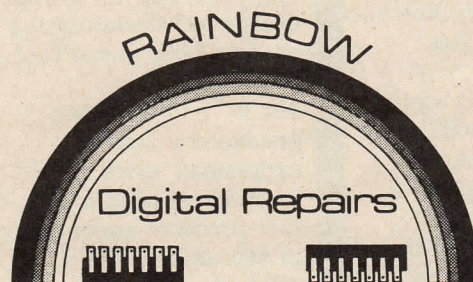
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# TECHNICAL HELPLINE

Colin Opie provides the answers to your technical problems

## Puzzled Programmer

Is it possible to buy a Cobol compiler for the QL?

This very short program puzzles me as it does not do what it should do:

```
10 a=0:b=0
20 input a;" + ";b;"
   =";(a+b)
30 goto 20
```

Every time I run the program everything works well, except that

you get the answer to the addition during the next run and not immediately after the input. For instance, if you input the first time 1 and 1 the answer would be 0. The next time you input 2 and 2, the answer would be 2 (1+1). A trick or a bug?

**Frederic Vandeplass,  
Knokke-Heist,  
Belgium.**

My initial thought about the program was "What do you mean by should do"? Let us consider the syntax and inherent syntactical execution of the INPUT statement. In its simple form you would have:

```
10 INPUT "Enter a
number: ";n
```

That would display the prompt within the quotes, collect a number from the keyboard and return that

number in the variable 'n'. So far, so good. Taking things a little further, the statement: 

```
10 INPUT a;" + ";b
```

 would fail to print an initial prompt and wait for a number to be typed on the keyboard. When that was done, the number would be returned in the variable 'a'. The INPUT statement would then print the "+" prompt and wait for

another number to be entered at the keyboard. The second number would be returned in the variable 'b'. There are no problems and no surprises yet. Now let us go one step further, as indicated in the letter. You have the statement:

```
10 INPUT
a;" + ";b;" = "(a+b)
```

If we follow the syntactical rules of the INPUT statement as outlined, all will go according to plan until the second prompt is issued — i.e., "=". The input statement will at that point be expecting a variable. The variable will determine the type of input required, e.g., numeric or string, but there is no such variable found. What is found is an expression. I can see what you wanted to do but INPUT certainly cannot.

Perhaps the real

question is "Why did SuperBasic not throw up a "syntax" or "bad line" error message?" I do not know but I know that what you are asking of INPUT is impossible. That is why there is such a thing as a PRINT statement.

I think the line should have been rejected by SuperBasic. To perform your intended input and output may I suggest:

```
10 INPUT a;
" + ";b;:PRINT " = ";
(a+b)
```

That line is not amazingly different but it is sound programming in terms of syntax and language analysis.

So far as I know there is not a Cobol compiler available for the QL. Metacomco seems to sell more languages than anyone and it certainly does not advertise a Cobol implementation.

## Still on the mend

Thank you for your article on Archive on the Mend in the September edition which supplemented the program. I still have one difficulty, namely line 204 in the original Chas. Dillon program:

```
204 BGET #5/x: y=x
```

My machine will not accept BGET as a keyword and reports "error in expression" when executing the line. I feel sure that the problem was covered in the magazine in one of the spring issues.

**John Mann,  
Stoke-on-Trent.**

In the September issue a bug fix for Archive on the Mend was shown.

Unknown to us at the time, there was another bug. As usual in programming you always correct one fault only to find several more. Have you ever had the feeling of *deja vu*? Certainly the readers both found that the line:

```
204 BGET #5/x: y=x
```

produced a 'bad expression' error. The reason is similar to the first problem encountered in September. The original program used Toolkit extensions to SuperBasic and BGET is yet another one.

There are two ways of solving the problem. First,

it is possible to re-write a few lines of the original program and keep to standard SuperBasic keywords. To do that, change lines 202 to 204 to be as follows:

```
202 x = in_ct - hist_lim - 1 :
if x < 0 : x = 0
203 y = x:
open_in #5, ipfil$: if x = 0 :
goto 205
204 for i = 1 to x : yn$ =
inkey$(#5, -1)
```

That is simply setting the file pointer to the appropriate position, which is all the extension BGET does — as used in the initial version. It is achieved by re-opening the file every time you want to set the file pointer. A file is always opened with its internal

pointer placed at the start of the data. If we then read and continuously throw away unwanted characters — line 204 — we will eventually point to the correct slice of data.

Unfortunately this sequential way of stepping through the file to set the file pointer can take a significant time. That is particularly so if your damaged file was a large one and you are setting the file pointer somewhere near the end of the file. Clearly the operation will take longer the further into the file you go, but the method will at least get you up and running.

In the book *QL*

## No bugs on us

I have read more than once in *QL World* or *QL User* the comment that if a program which has been printed in the magazine is found not to run correctly, it must have been typed-in incorrectly by the reader. Nonetheless, I venture to ask for your help with the programme printed in August, 1986 p. 49, *QL-Bert*.

What has failed in my case is the use of the letter "C" as cursor. "H" moves BERT UP diagonally to the left; "B" moves BERT DOWN diagonally to the right; "D" moves BERT UP diagonally to the left; and it follows that "C" should move BERT DOWN diagonally to the left but it does not — it moves him exactly the same way as the letter "D", namely UP diagonally to the left.

That makes it impossible to cover the whole of the first pyramid. I can find no slip on my part in the portion of the program between 2000 and 2140 —

PROCedure move\_man.  
Can you help?

I have one other query about the program. It will not run when recorded on disc, using the QDisc (CST) interface, because "BIN\$" — see lines 7570 and 7590 — is a QDisc command. Nor, of course, will it run even from a Microdrive so long as the QDisc remains plugged-in. I do not like taking this out more often than

necessary.

I found the same problem with the program *Golf* — May, 1985 — where PUT is a QDisc command but I solved it by using the more correct spelling for that part of the game, PUTT. How can I change the *QLBert* programme to eliminate "BIN\$"?

**Rev. M. P. L. Wall,  
Trowbridge, Wilts.**

'figur' and 'figur2'. The latter two procedures contain one of the great faults of professional programming, the use of a lower-case 'l' as a variable name. It is too often confused with the number 'one'. Please check that your version is using the variable 'l' and not the digit '1'.

Regarding the use of 'BIN\$', there is a very simple step you can take. The method is the same as the way in which you solved your problem in *Golf*. Change the function name in line 8000 to, say, 'XBIN\$', and then go through the program, changing all references to BIN\$ into XBIN\$.

There does not appear to be anything wrong with the program *QLBert* as listed in the August issue — on an unexpanded QL, that is. If the "C" key is not working correctly for

you, please look carefully at lines 2010, 2020, 2080 and 2090 again. Make sure they are exactly as listed.

You might also like to check the two procedures,

## Caught in a trap

Thank you for the help on using the CTRL ports on the QL and for the connector information. As one relatively new to assembly language programming it would be helpful if you could show how to use the correct TRAP call to scan the keyboard.

**Mark Jonty,  
Portsmouth.**

It seems that you appreciated the notes about the use of the joystick ports in the October issue, with one exception. Before I begin to answer this query I must tell you that in my version of the October column I had an example assembly language program for reading the keyboard directly — as related to the controller port keys. Somehow, no doubt in the desperate effort each month to cram in everything, the program did not appear.

To recall, the KEYROW(row) function is obtained by using the MT.IPCOM call (Trap #1, D0=\$11). Admittedly this must be one of the most awkward Qdos calls to

use, mainly because of the weird command code sequences of the process controller chip. To sort things out, the following

D0=1). It would be better to use the example to read the keyboard directly. In that way you will not be restricted by the INKEY delay time

Scan a key row given by D1.B on entry:  
D1=0 : Function key row (CTL2)  
D1=1 : Cursor key row (CTL1)  
Returns the column code in D1.B on exit.  
Affects: D0, D1

```
keyrow:  movem.1  d5,d7,a3,-(a7)  ;Save registers
         lea      rownum(pc),a3  ;Get row data
                                         space
         and.b    #7,d1          ;Ensure range
                                         0..7
         move.b   d1,(a3)        ;and set row
                                         number.
         lea      cmmd(pc),a3    ;Get ptr to
                                         command.
         moveq    mt_ipcom,d0    ;Set TRAP code
         trap     #1             ;and perform
                                         scan.
         movem.1  (a7)+,d5,d7,a3 ;Restore
                                         registers.
         rts

cmmd:    db      9               ;IPC command
                                         sequence
         db      1               ;1 parameter
         dl      0               ; - of 4 bits
rownum:  ds      1               ;Row number
         db      2               ;Return a byte
```

procedure would work perfectly:

The SuperBasic function INKEY\$(t) can be replaced by the Qdos call 10.FBYTE (TRAP #3,

and repeat times as set by Qdos. The result is a faster response to key checking and a much smoother screen indicator.

*Assembly Language Programming* — McGraw-Hill, 1984 — chapter 12 includes a number of direct file-handling procedures, of which one is SET\_POS. If you were to add that extension to SuperBasic you would need to change line 204 to read:

```
204 SET_POS #5,x : y=x
```

The advantage, of course, is that there is no speed penalty the further into the file you point and the setting of the file pointer is very fast anyway.

You will be glad to hear that some testing has been performed on the modified version and it now seems to be fully functional.

With a little ingenuity, Hassan Fakhri managed to turn Archive into a powerful tool for analysing market research data.

**M**y first acquaintance with the QL dates from December, 1984 in Paris, where I acquired an English keyboard machine and was fortunate enough to have a JM version. The QL was used for simple programming and most of all as a word processor. Learning to use Archive followed much later with the creation of a small personal database of French exporting companies in the building trade — air conditioning, plumbing and electricity.

The opportunity to use Archive for a serious business application occurred last April while I was following a marketing and export training course at the CESI, a specialised business school in the south of Paris.

The training scheme was based mainly on the export of French consumable products to the British market. In one of several study groups we negotiated and obtained the sponsorship of a French manufacturer of decorative car accessories. The product concerned was a kit of matching wheel covers, seat covers and decorative side strips, with a range of 10 colours.

Our objective was to provide the sponsor with a report about the feasibility of exporting such a product to the British market. The same report was destined to be

submitted in front of a specialised jury at the CESI. The work involved desk and field research. The field research consisted of a product test and a street survey.

The product test was carried-out using a car fitted for the purpose. It was done in a few hours by four members of the study group, with the help of an adapted questionnaire — 49 interviews. Analysis of the results was done manually.

The street survey was conducted by means of a detailed questionnaire — 44 questions — and a target figure of 240 interviews. The results of the work and the statistical analyses involved were obtained via the internal programming language of Archive. Both questionnaires were written, corrected and finalised on Quill.

From the beginning we had to set our target and segmentation figures for the street survey. Those figures were:

1. Sample size 240.
2. Male/female 158/82.
3. Age groups six groups.
4. Socio-professional — four categories with individual figures for

each group and category.

The proportions for 2, 3 and 4 were obtained from official British statistics. The male/female breakdown was related to use or ownership of cars. The number of interviews was limited to 240 for time reasons. The idea was to make an approach to the decorative car accessories market. We will see later how Archive helped the daily updating and orientation of our



work to be as close as possible to our target figures.

After 12 interviews in the Greater London area, we started to look at the possibilities with Archive. Our questionnaire consisted of 44 questions, so we created a file — quesrue1\_dof — of 44 fields — Q01 to Q44\$. By using the SEDIT command we designed a screen where all 44 fields could fit. We tested that screen and found that it

was relatively difficult to fill and read because of the large number of fields. We also had to allow for a limited number of characters per field. Any field exceeding that limit would create difficulties in analysis work.

A new factor emerged while we were doing the testing operations. Because of the variety of answers to some questions, we had to decide to split each of those questions into several fields. That led us to create a new file — quesrue2\_dbf — with 56 fields instead of 44. At that point the one screen solution became even more delicate to use. In the absence of a scrolling facility in Archive, we opted for a multiple screen solution — three screens.

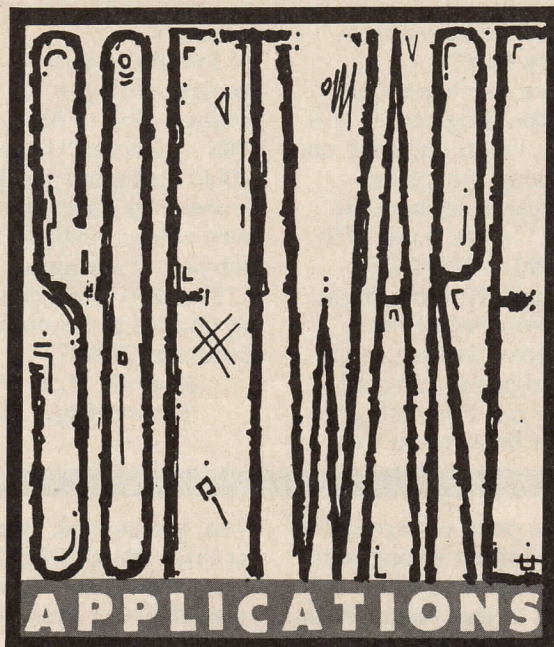
The first screen was the Archive default screen with the first field destined for the questionnaire number. The second and third screens were designed similar to the first one, i.e., with one line per field. The questionnaire number field — Q01 — was repeated in screens two and three. We ended with:

Screen 1: 20 fields — Q01 to Q20.

Screen 2: 20 fields — Q01+Q21 to Q39.

Screen 3: 18 fields — Q01+Q40 to Q56.

Inputting all the answers to the questionnaires proved a very time-consuming operation. We thought that the input for the second and third screens and the use of the proper commands could become a source of continuous confusion. The input was carried-out by three members of the group, so we wrote the following simple and short program with which we started every daily session of input:



## INPUT program

```
start:mode
  open
  "mdv2_quesrue2_dbf"
end proc
S1: display
  (Archive default
   screen)
  insert
  end proc
      F5+ESC
S2: sload
  "mdv2_screen2_scn"
  screen
  alter
  end proc
      F5+ESC
S3: sload
  "::mdv2_screen3_scn"
  screen
  alter
  end proc
      F5+ESC
```

Then, record after record, we had to type S1, S2 and S3 to obtain the correct sequence of screens. It was necessary always to start with S1 for each new record and to type F5 and ESC after each screen has been filled. To end our session, we typed CLOSE. ALTER was used instead of INSERT in screens two and three to prevent Archive considering the input of those screens as separate records.

All the hard work of the day had to be backed-up safely. For that purpose we wrote the following procedure, probably not the best way to do the backing-up, but it served our needs and was very straight-forward to use. We added the procedure at the end of our INPUT program, so it was loaded at the same time and was ready to be used at the end of each daily session. The BACKUP command worked without any trouble, in spite of the poor reputation it seems to have:

```
BKU: mode
  print at 10,10; "put
  destination cartridge
  in mdv1"
  print at 12,10; "put
  source cartridge in
  mdv2"
  print at 15,10; "HIT
```

```
ANY KEY"
input y$
kill
"mdv1_quesrue2_-
dbf"
backup
"mdv2_wuesrue2_-
dbf" as
"mdv1_quesrue2_-
dbf"
cls
print at 10,10;
"BACKUP DONE"
end proc
```

The multiple screen input could be extended to more than three screens provided we did not exceed the maximum number of fields allowed in Archive.

To conduct our street survey we needed some kind of control to keep as close as possible to our segmentation figures. The daily control was done by a set of procedures giving us:

	Target	Real
Sample size	(240)	?
Male	(158)	?
Female	(82)	?
Age (15/24)	(26)	?
	(6 groups)	
	(65+)	?
S.P.C. AB	(53)	?
C1	(65)	?
C2	(72)	?
DE	(50)	?

After each daily batch of input we ran the program which displayed — at the ?s — the updated figures for the day. That indicated how far we were from target figures in each segment. Although the SPC — socio-professional categories — were more difficult to adjust than the sex and age segments, we had a daily guideline helping us to orientate the survey towards the required persons. With 240 records and 56 fields per record, we were certain that the QL needed a RAM extension. So we bought a 512K Miracle Expanderam.

That way the memory capacity problem was solved but the cartridge capacity was not. To have all our main file on one cartridge, we decided to

codify some answers in a few words, letters or figures. The coding enabled us to reduce the size of our main file to 43K only.

The extra RAM reduced the access to the Microdrives considerably. The typical example was to have in memory our main file — 43K — and four other secondary files — 5K to 18K — plus a long program of procedures — 13K — plus all the help file (ARCH\_HOB) and to use all those files with negligible access to the Microdrives. All those files had to be retrieved by Archive at least once.

Most of the procedures we wrote started by putting on paper the type of information we wanted Archive to retrieve from the survey files. A few examples are classification of the



product — 10 colours and styles; prices expected by the consumers — mini, maxi and average; who are the would-be customers — sex, age and SPC?; buying probabilities and determination of the potential market; with what type of distribution and communication the public associates the French product?

The 13K program used five files at the same time and was used to obtain figures related to the intention of buying by the potential customers. Those intentions were given values from 0 — no intention — to 5 —

maximum intention. Archive displayed those figures for all the segments we saw earlier. Without going into details, the program enabled us to obtain important mathematical factors which were used with other statistical figures — cars in Great Britain and so on — to determine the potential market of the French decorative car accessory object of our survey.

Other important figures given by the program were purchasing probabilities related to the equipment and to each one of its elements, with the percentage error margin in each case. Running the program after each daily input showed us the progressive decrease of the error margins with relation to the size of the sample.

A multi-tasking experiment was undertaken by the use of Eidersoft Ice and Choice. We had Ice, Quill, two Archives available at the same time. One Archive task had 180K allocated and was used with our survey files. The result was not so good as with Archive alone in memory. The memory allocation was sufficient but the Microdrives were still accessed frequently.

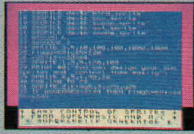
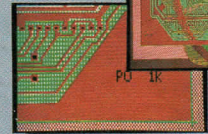
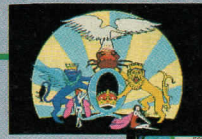
I must mention the frequent use we made of Mike O'Reilly's book, *Database Management*. Part of the screen design and many of the 22 programs were improved because of the explanations and examples about 'gazet\_dbf'. The creation of our secondary files, extracted from the main file, was made possible by the pertinent advice given on the telephone by Sandra Essex of Quanta.

I conclude by hoping that Psion will improve Archive by adding a facility to scroll the screen both for input and display.

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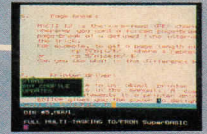


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### CLARIFICATION

Digital Precision would like to make it quite clear that the technical term 'pseudo compiler' used to describe QLiberator refers to the 'pseudo code' which that product interprets, in a manner analogous to SuperBASIC, but less slowly, when a pseudo-compiled task is run.

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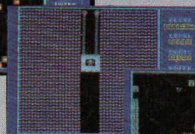
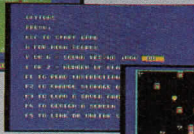
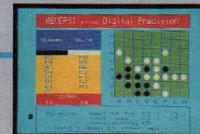
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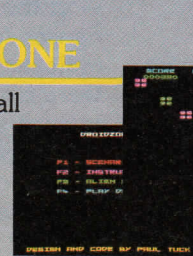
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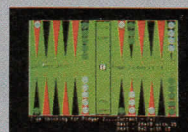
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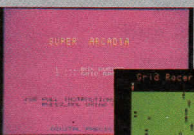
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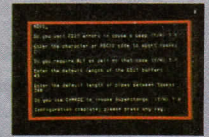
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# TURBO

## A TOTALLY NEW COMPILER BY SIMON GOODWIN



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**SPEED** – TURBO is an optimising SuperBASIC compiler, even faster than SUPERCHARGE! Remember, SUPERCHARGE itself was three times faster than the pseudo compiler QLiberator (review, QL WORLD, October 1986) even without using SUPERCHARGE's speed optimising facility! TURBO has a completely new, fast, compact library.

**COMPATIBILITY** – With the entire syntax of SuperBASIC.

**MULTITASKING** – You can run any number of tasks simultaneously – all utilities for task management supplied.

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Any number of tasks can share procedures & functions.  
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**COMPACT** output code, with zero library overhead – no need for separate (8K!) interpreter runtimes.

**FAST COMPILATION** – much faster than SUPERCHARGE, which was twice as fast as the pseudo compiler (QL WORLD, October 1986) – 108K of typical SuperBASIC compiled to 72K, parsing at the rate of 480 lines/min & code generating at the rate of 940 lines/minute.

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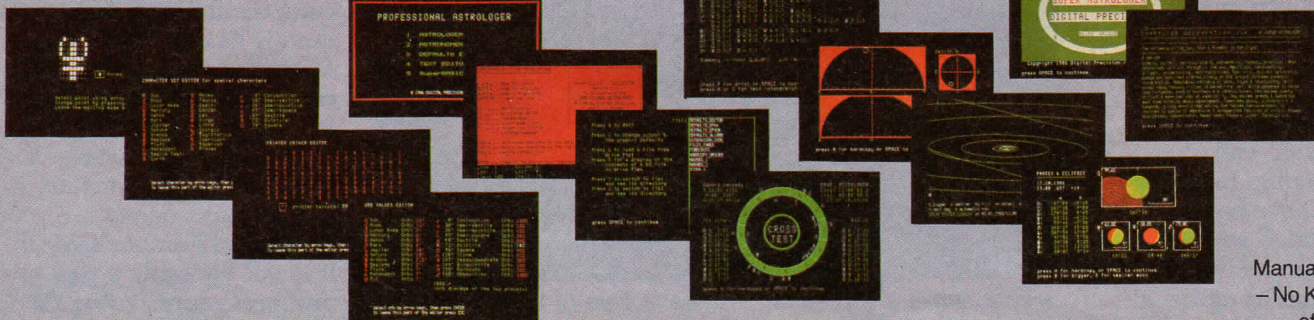
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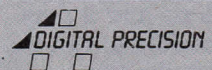
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# S I C R E E N

## queeze

With its massive 32K screen memory the QL offers greater visual versatility than most micros. The problem is where do you store all that data? James Lucy shows you how to squeeze those screens.

One of the delights of a 128K computer is that a substantial amount of RAM can be dedicated to the screen. The Spectrum manages to spare about 8K to produce the pictures but the QL uses 32K. The problems begin to arise when you save the screen to Microdrive and discover that it consumes about one-third of the total capacity of the tape. Clearly it would be useful to be able to compress the data which makes up the screen by some method and a technique usable for the screen might well be applicable to other data, too.

A simple method of data compression is described, along with a complete assembly language program listing. To make the system really easy to use, the compression and corresponding expansion routines have been implemented as extensions to SuperBasic, so they can be called at any time.

If a screen has been generated by a SuperBasic program, perhaps the most compact way to save it is by saving the program; the problem is that it may take some time to draw and it may not be possible to run the program at the time you wish the screen to appear.

Incidentally, if time is not a problem but you would prefer the picture to appear as a whole, without the user seeing the drawing process, it is possible to blank the display while drawing with these pokes — to blank POKE 98403,2 and to restore POKE 98403,0 for monitor mode.

The second and usually most space-consuming

occupied by the default TV mode channel 1, use SBYTES mdvn\_filename, 133120, 25600 which reduces the size of the file by some 20 percent.

The programs which appear at figures one, two, three and four constitute a third possible method of saving screens which can give very substantial reductions in the size of the screen file. They compress the data using a very simple algorithm, although as usual the coding becomes rather more complicated. The principle is that if we

screen memory location and the number of such locations. The two numbers contrast with the 32768 numbers used by SBYTES. The most convenient unit of screen memory to use is the word — two bytes, 16 bits — because the QL hardware considers words when working-out the individual pixel colours.

Provided that a screen is not too detailed, with many successive pixels differing in a non-regular manner, it is more compact to describe the screen as a list of pairs of numbers defining the colour and the number of words of that colour. All that is needed then is a program to prepare such data and to reconstitute it when required.

Figure one is a SuperBasic program to compress the screen data. It reserves some resident procedure space to act as a buffer for the compressed data, does the compression and then dumps its data to a Microdrive file. The compression is done by looking at successive words of screen data — if the word is the same as the previous one a counter in incremented; if it is not the same a pair of numbers representing the screen word value and the number of that value is written to the buffer. The program works well, the snag being that it takes several minutes to compress the screen, and the corresponding expansion program — figure two — is similarly sluggardly.

Any task involving

Figure 1.

```
100 REMark CONTRACT_bas
110 REMark Program to contract a screen picture
120 REMark Creates a file on mdvl called 'screen_pic'..
130 REMark which may be reformed into a picture by...
140 REMark the accompanying program EXPAND_bas.
160 buf_base=RESPR(25000)
170 screen_start=131072
180 current_colour=PEEK_W(screen_start)
190 number_of_words=1
200 screen_size=32768/2
210 present_pos=buf_base
220 FOR word=1 TO screen_size
230 IF PEEK_W(screen_start+word*2)=current_colour THEN
240 number_of_words=number_of_words+1
250 ELSE
260 POKE_W present_pos,current_colour
270 POKE_W present_pos+2,number_of_words
280 current_colour=PEEK_W(screen_start+word*2)
290 number_of_words=1
300 present_pos=present_pos+4
310 END IF
320 END FOR word
330 POKE_W present_pos,current_colour
340 POKE_W present_pos+2,number_of_words
350 IF present_pos-buf_base > 25000
360 THEN PRINT E0,'Too detailed':STOP
360 SBYTES mdvl_screen_pic,buf_base,present_pos-buf_base+4
370 PRINT E0,'Finished'
```

way to store a screen is, of course, SBYTES mdvn\_filename, 131072, 32768 with the corresponding LBYTES to restore it. Only three screens will fit on a Microdrive, although it is worth remembering that it is not always necessary to save the whole screen area. For instance, if you wish to save only the area

have five of any particular object, apples for example, we say exactly that — 'five apples'; we do not say we have 'an apple, and an apple and an apple' and so on.

So if a screen is all one colour, green say, it is possible to describe it by only two numbers — the value of an individual

Figure 2.

```

100 REMark EXPAND_bas
110 REMark Program to expand file mdvl_screen_pic..
120 REMark created by CONTRACT_bas
130 buf_base=RESPR(25000)
140 screen_start=131072
150 index=0;so far=-2
160 LBYTES mdvl_screen_pic,buf_base
170 REPEAT fill_screen
180 colour=PEEK W(buf_base+index)
190 number_of_words=PEEK W(buf_base+index+2)
200 begin=screen_start+so_far+2
210 ending=screen_start+so_far+2*number_of_words
220 FOR do_colour=begin TO ending STEP 2:Poke W
do_colour,colour
230 so_far=so_far+2*number_of_words
240 index=index+4
250 IF so_far >= 32767 THEN EXIT fill_screen
260 END REPEAT fill_screen

```

doing simple things to large amounts of data is a natural for assembly language and the source code listing at figure three is the outcome. It is very similar in operation to the SuperBasic programs, the difference being that it is twice as fast. Although

not strictly necessary, the opportunity has been taken to link the routines into SuperBasic so that they are available as keywords; they can be installed at power-up with any other SuperBasic extensions to hand by a simple boot program.

Figure 3.

```

*****
***** QL SCREEN-SQUEEZER *****
*****
* Program to add keywords SQUEEZE and EXPAND to Basic
*
* Note that the routines when called require 32K of work area.
* The format of the commands is SQUEEZE 'mdvl filename',
* EXPAND 'mdvl filename' where 'filename' is chosen by the user. Note the
* necessity of quote marks.
* Type all 'E' signs as hashes
* James Lucy June 1985 Tel 0621-891715
*
* For the Metacomco Assembler.
*
* QDOS constants:
*
BP.INIT EQU $110 Links in keywords to Basic
CA.GTSTR EQU $116 Gets a string parameter from Basic
IO.OPEN EQU $01 Opens a channel
IO.CLOSE EQU $02 Closes a channel
IO.NEW EQU 2 Denotes new, exclusive file
IO.OLD EQU 0 Denotes old, exclusive file
IO.SSTRG EQU $07 Sends a string of bytes to a channel
IO.FSTRG EQU $03 Fetches a string of bytes from a channel
MT.ALCHP EQU $18 Allocates common heap space
MT.RECHP EQU $19 Releases common heap space
UT.MTEXT EQU $D0 Writes a message to a channel
BV.RIP EQU $58 Pointer to arithmetic (RI) stack
*
ME EQU -1 Signify this job
SCR_BYTES EQU $8000 Number of screen bytes
SCR_START EQU $20000 Address of screen start
MAX_SIZE EQU $7000 Larger than this may as well use SBYTES
*
* First link in the Basic keywords using BP.INIT
*
LEA PROCDEF,A1 Point to the proc. and fun. table
MOVE.W BP.INIT,A2
JSR (A2)
MOVEQ #0,D0 Ensure good..
RTS ..return to Basic
*
* Table in format required by BP.INIT..
*
PROCDEF DC.W 2 Number of procedures
DC.W SQUEEZE-* Pointer to routine relative to here
DC.B 7,'SQUEEZE' Number of letters in proc name, then name.
DC.W EXPAND-* Pointer to second routine
DC.B 6,'EXPAND',0 and name, extra 0 to align 7 bytes
DC.W 0 End of procedures
DC.W 0 No functions
DC.W 0 End of functions
*
* Now follows the action to be taken on calling 'SQUEEZE'
*
SQUEEZE
*
BSR SET_UP Set_up gets a filename and allocates RAM
TST.L DO Any errors?
BEQ.S COMPRESS No, so carry on
RTS Yes, so return to Basic writing error
*
COMPRESS MOVEQ #0,D2 D2 is used as a counter, so initialise.
MOVEQ #1,D4 ditto D4
MOVEA.L #SCR_START,A1 Point to start of screen memory..
MOVE.W (A1),D1 ..and store its contents
ADDA.L #2,A1 Look at next screen word..
NEXT MOVE.W (A1)+,D3 ..and store its contents
CMP.L #MAX_SIZE-4,D2 Is the number of stored bytes too big?

```

```

BGE TOO_BIG Yes, so abort
CMPA.L #28000,A1 Have we reached the end of the screen?
BEQ.S ALL_DONE Yes, so stop compressing
CMP.W D1,D3 Are the two screen words the same?
BNE.S NOT_SAME No, so do something about it
ADDD #1,D4 Yes, so increase count of same screen words
BRA.S NEXT and look at the next word
*
NOT_SAME
BSR.S SAVE_DATA Save the data on our heap
MOVEQ #1,D4 Reset the counter to 1
MOVE.W D3,D1 Reset the old colour to the new
BRA.S NEXT and look at the next word
*
SAVE_DATA
MOVE.W D1,(A5)+ Save the colour on the heap
MOVE.W D4,(A5)+ and the number of words of that colour
ADDD #4,D2 Update the number of bytes used
RTS and return to caller
*
* We now have a heap containing the screen in a compressed form, a sequence
* of pairs of words giving each colour, and number of that colour.
*
* Open a channel to dump heap to microdrive
*
* We got here when A1 reached $28000
*
ALL_DONE BSR.S SAVE_DATA Nearly forgot to save the last lot of data!
MOVE.L D2,-(A7) The forthcoming trap seems to corrupt D2,
save it on the stack.
*
MOVEQ #IO.OPEN,D0 Prepare to open a channel
MOVEQ #E1,D1 for this job
MOVEQ #IO.NEW,D3 a new,exclusive file
LEA FILENAME,A0 whose name is at 'FILENAME'
TRAP #2
TST.L DO Any errors?
BEQ.S OK2 No, so carry on
MOVE.L (A7)+,D2 Yes, so remove D2 from the stack
BSR.S REHP release heap space
RTS and back to Basic
*
OK2
*
* Now send the bytes in the heap to the channel
*
MOVE.L (A7)+,D2 Unstack number of bytes stored
MOVEQ #IO.SSTRG,D0 and prepare to send them,
MOVEQ #E-1,D3 with indefinite timeout,
LEA BUF_BASE,A4 starting from the base
MOVEA.L (A4),A1 of the heap to the channel whose address
TRAP #3 is still in A0 from the previous trap
TST.L DO Any errors?
BEQ.S OK3 No, so carry on
BSR.S CLO Yes so close channel
BSR.S REHP release heap space
RTS and back to Basics
*
OK3
*
* Close the channel
*
CLO MOVEQ #IO.CLOSE,D0 Prepare to close the channel whose ID is
TRAP #2 still in A0
TST.L DO Errors?
BEQ.S OK4 No, so continue
RTS
*
OK4
*
* Release the heap space
*
REHP MOVEQ #MT.RECHP,D0 Prepare to release our heap space
MOVEA.L (A4),A0 A4 still points to base of heap
TRAP #1 Do it
MOVEQ #0,D0 and make a good
RTS return to Basic
*
* Action to be taken if attempt at compression results in greater than
* $7000 bytes
*
TOO_BIG LEA BUF_BASE,A4
BSR.S REHP Release heap space
MOVE.W UT.MTEXT,A2 Use vectored utility
SUBA.L #A0,A0 to write to channel 0
LEA MESSAGE,A1 the text at MESSAGE
JSR (A2)
MOVEQ #0,D0 and return
RTS
*
* Routine called when keyword EXPAND is used
*
EXPAND
*
BSR.S SET_UP Get the filename and allocate heap space
TST.L DO Errors?
BEQ.S OK7 No, so carry on
RTS Yes, so return
*
* Open the channel from microdrive
*
OK7 MOVEQ #IO.OPEN,D0 Prepare to open
MOVEQ #E1,D1 for this job
MOVEQ #IO.OLD,D3 an old, exclusive file
LEA FILENAME,A0 of name at FILENAME
TRAP #2
TST.L DO Errors?
BEQ.S OK5 No, so carry on
BSR RECHP Yes, so release heap
MOVEQ #E-1,D0 Set 'not complete' error
RTS
*
OK5

```

```

*
* Fetch the bytes from the microdrive and put on heap
*
MOVEQ  #10,FSTRG,D0      Prepare to fetch a string of bytes
MOVE.W #ESCR BYTES-1,D2  to a buffer of almost $8000 bytes
MOVE.W #E-1,D3          with as much time as necessary
MOVEA.L A5,A1           base of buffer still in A5
TRAP   #E3
TST.L  D0              Errors?
BEQ.S  #E3,DO          no, so carry on
CMPI.L #E-10,DO       EOF?
BEQ.S  #E3,DO          carry on
BSR    ALL_OVER        otherwise close channel,release heap
MOVEQ  #E-1,DO         set 'not complete' error
RTS    and return

FETCHED
* Reconstitute heaped bytes into picture
*
MOVEA.L A5,A1           Use A1 as pointer to base of heap..
MOVEA.L #ESCR_START,A2 and A2 to base of screen.

READ_DATA
MOVE.W (A1)+,D2        Take a colour from the heap
MOVE.W (A1)+,D1        and the number of that colour
SUBI.W #1,D1           Prepare D1 for a DBF loop

FILL_COL
MOVE.W D2,(A2)+        Move the colour to the screen
DBF    D1,FILL_COL    and continue until D1=-1
CMPA.L #E$27FF8,A2    At the end of the screen?
BLE.S  READ_DATA      No, so read some more data

*
ALL_OVER
MOVEQ  #10,CLOSE,D0    Yes, so close the channel
TRAP   #E2
TST.L  D0
BEQ.S  #E3,RECHP      release the heap space
RTS    and return to Basic or caller

RECHP
MOVEQ  #EMT.RECHP,D0
MOVEA.L A5,A0
TRAP   #E1
MOVEQ  #E0,D0
RTS

*
* This section is used by both EXPAND and COMPRESS
*
SET_UP
*
* Get name of file to be used from the procedure call
*
MOVE.L BV.RIP(A6),A1   Point to RI stack, if it wasn't before
MOVE.W CA.GTSTR,A2     Use vectored utility to get a string
JSR    (A2)            onto the RI stack
CMPI.W #1,D3           Only one parameter?
BEQ.S  #OKP            Yes so continue
MOVEQ  #E-15,D0        No, so set 'bad parameter' error
RTS    and return
OKP   MOVE.W 0(A6,A1.L),D0 TOS contains number of characters in filename
LEA   FILENAME,A0     Point to base of area reserved for filename
MOVE.W D0,(A0)+        and move D0 into it
ADDQ  #E2,A1          Skip past number of chars on RI stack
SUBQ  #1,D0           and set up D0 for a DBF loop

*
FNAME_LOOP
MOVE.B 0(A6,A1.L),(A0)+ Take a byte from RI stack to filename buffer
ADDA.L #1,A1          Skip past it
DBF    D0,FNAME_LOOP and continue until all bytes moved

*
MOVE.L BV.RIP(A6),A1   Reset RI stack pointer
* Now allocate some heap space
*
MOVEQ  #EMT.ALCHP,D0   Heap space
MOVEQ  #EME,D2         for me
MOVE.L #ESCR BYTES,D1 of $8000 bytes
TRAP   #E1
TST.L  D0              Errors?
BEQ.S  #OK1            no, so carry on
RTS    Yes, so return
OK1   MOVEA.L A0,A5     Save base of heap in A5
LEA   BUF_BASE,A2    and in
MOVE.L A5,(A2)        Buf base
RTS    and return to caller

*
* Reserve some storage space
BUF_BASE DS.L 1        Storage for base of heap
FILENAME DS.L 10       Storage for filename
*
* Message to be sent if compression fails:
*
MESSAGE DC.W 20        Number of characters in message
DC.B 'SCREEN TOO DETAILED.'
*
END

```

The speed of the compression and expansion routines is startling — around one second in each case, although the file loading and saving takes much longer. As the QL uses spare memory to store previously-loaded Microdrive blocks, a compressed screen, once loaded, is usually available instantly. For pictures of a type which may be used as, say, a title screen with

comparatively large areas of uniform colour, the program can reduce the screen file by anything up to three-quarters.

As the screen becomes more detailed the compression is less effective and, in fact, the machine code program will abort if the compressed file is larger than seven-eighths of an LBYTES file. That is likely to happen on a screen filled with a moire pattern.

The source code listing is fairly self-explanatory. It is not claimed to be particularly elegant and if you needed even more speed it would be possible to store the number of data pairs produced as the first item of data on the file, then use this value to control the reconstitution loop.

Figure four is the SuperBasic loader program for the machine code. It will generate a file called 'screen\_squeeze' which should subsequently be loaded into resident

procedure space and called, e.g., a=RESPR(512):LBYTES mdvl\_screen\_squeeze, a:CALL a. That will link in the extra SuperBasic keywords as described in the source code listing. Note the need for quotes around any filename you may be using for a screen, i.e., SQUEEZE 'mdvl\_filename'

I hope you enjoy experimenting with the programs. One possibility which may appeal is that the compressed screens could be held in memory rather than on drive.

```

Figure 4.
100 REMark Basic loader for SQUEEZE/EXPAND
110 REMark Creates a file 'mdvl screen squeeze'..
120 REMark which contains the m/c for SQUEEZE/EXPAND
130 REMark This file may be used by typing:
140 REMark a=RESPR(512):LBYTES mdvl_screen_squeeze,a
150 REMark CALL a
160 checksum=0:base=RESPR(512):num_bytes=468
170 RESTORE 280
180 FOR offset=0 TO num_bytes-1
190 READ byte:checksum=checksum+byte
200 POKE base+offset,byte
210 END FOR offset
220 IF checksum <> 34972
230 PRINT "Wrong Data":BEEP 10000,255:STOP
240 END IF
250 CALL base
260 PRINT#0,"Keywords SQUEEZE, EXPAND installed"
270 SBYTES mdvl_screen_squeeze,base,num_bytes
280 DATA 67,250,0,12,52,120,1,16,78,146
290 DATA 112,0,78,117,0,2,0,26,7,83
300 DATA 81,85,69,69,90,69,0,180,6,69
310 DATA 88,80,65,78,68,0,0,0,0
320 DATA 0,0,97,0,1,22,74,128,103,2
330 DATA 78,117,116,0,120,1,34,124,0,2
340 DATA 0,0,50,17,211,252,0,0,0,2
350 DATA 54,25,12,130,0,0,111,252,108,0
360 DATA 0,104,179,252,0,2,128,0,103,24
370 DATA 182,65,102,4,82,68,96,228,97,6
380 DATA 120,1,50,3,96,220,58,193,58,196
390 DATA 88,66,78,117,97,246,47,2,112,1
400 DATA 114,255,118,2,65,250,1,24,78,66
410 DATA 74,128,103,6,36,31,97,36,78,117
420 DATA 36,31,112,7,118,255,73,250,0,254
430 DATA 34,84,78,67,74,128,103,6,97,4
440 DATA 97,12,78,117,112,2,78,66,74,128
450 DATA 103,2,78,117,112,25,32,84,78,65
460 DATA 112,0,78,117,73,250,0,216,97,240
470 DATA 52,120,0,208,145,200,67,250,0,248
480 DATA 78,146,112,0,78,117,97,114,74,128
490 DATA 103,2,78,117,112,1,114,255,118,0
500 DATA 65,250,0,184,78,66,74,128,103,8
510 DATA 97,0,0,80,112,255,78,117,112,3
520 DATA 52,60,127,255,54,60,255,255,34,77
530 DATA 78,67,74,128,103,16,12,128,255,255
540 DATA 255,246,103,8,97,0,0,36,112,255
550 DATA 78,117,34,77,36,124,0,2,0,0
560 DATA 52,25,50,25,4,65,0,1,52,194
570 DATA 81,201,255,252,181,252,0,2,127,248
580 DATA 111,234,112,2,78,66,74,128,103,2
590 DATA 78,117,112,25,32,77,78,65,112,0
600 DATA 78,117,34,110,0,88,52,120,1,22
610 DATA 78,146,12,67,0,1,103,4,112,241
620 DATA 78,117,48,54,152,0,65,250,0,58
630 DATA 48,192,84,73,83,64,16,246,152,0
640 DATA 211,252,0,0,0,1,81,200,255,244
650 DATA 34,110,0,88,112,24,116,255,34,60
660 DATA 0,0,128,0,78,65,74,128,103,2
670 DATA 78,117,42,72,69,250,0,6,36,141
680 DATA 78,117,0,0,0,0,0,0,0,0
690 DATA 0,0,0,0,0,0,0,0,0,0
700 DATA 0,0,0,0,0,0,0,0,0,0
710 DATA 0,0,0,0,0,0,0,0,0,0
720 DATA 0,0,0,0,0,0,0,20,83,67
730 DATA 82,69,69,78,32,84,79,79,32,68
740 DATA 69,84,65,73,76,69,68,46

```

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# COMMS COMMS CO

The market for modem-based communications is still growing. Consequently we should not be surprised when new modem designs and equipment reach the market. I was nonetheless surprised when I saw the new offering from Miracle Systems. Costing £49 inclusive of VAT and P&P – a small box measuring 7cm. x 5cm. x 2.5cm. with an LED on the top, a small length of cable going into one side and a three-metre length of cable emerging from the other side. There is a Microdrive cartridge and a 10-page manual as well.

In the old days you could rent a modem from the telephone people at enormous cost and promptly hang any computer on the end of it. With a telephone line at the other end, data transmission protocols and speeds would be manipulated as necessary by the modems. In other words, the hardware was relatively intelligent and would permit any number of transmission requirements. There is a similar, though not identical, approach in the Astracom 1000 modem reviewed last month.

Clearly that is not the principle behind the Miracle Systems modem. Instead, the rather sensible approach adopted, so far as the private QL owner is concerned, has been to make the hardware as cheap and small as possible, while doing everything else in software. The disadvantage, of course, is that the whole package is rather limited for use only on the QL.

Is that a disadvantage to the private owner? I think not. In the majority of cases you are buying a modem to talk to databases such as Prestel using your QL. There are no other design requirements. Also, the almost certain arrival of new QL compatibles, and the continued support for QLs in general, means that for the foreseeable future your set-up will continue to be operational.

Should minor adjustments be required on the software front when QL compatibles are used, I have the impression that Miracle Systems will be there, ready and willing.

So much for the overall design. What will it do? In common with other modems available it will support 1,200/75 baud transmission for Prestel, 1,200/1,200 baud half duplex transmission, and auto-dialling. It is not British Telecom-approved, which is not surprising,

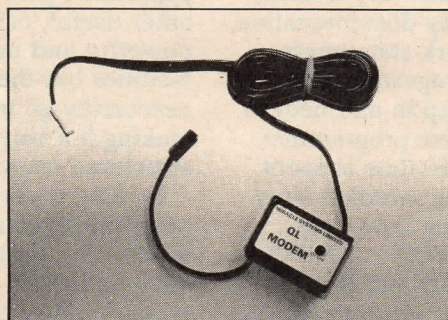
Colin Opie discovers that the miniature modem from Miracle Systems is big on features.

as the process seems to take an incredible time and is not cheap.

The unit is completely isolated. In addition to that the QL half of the electronics takes its power from the QL +12V line on one of the SER2 pins and the telephone half of the electronics takes its power from the telephone system, in much the same way as telephones with number memories. The result is a totally safe and workable unit.

The short lead fits into SER2 and the three metre lead wanders to a telephone point. You cannot have these two round the wrong way as the plugs are keyed. The red LED on the top of the box will light whenever auto-dialling is being performed and when the modem is on-line. The design of the leads means that the modem box rests just behind a QL. That proves to be neat, aesthetically pleasing, and easy for viewing the modem status LED.

The software package supports a host of features. Auto-dialling is programmable and no fewer than 32 numbers can be stored and selected from the main menu. The version I was using had numbers for Prestel/Micronet, The Gnome at Home, Brixton ITEC, Technoline, ITCU Exchange and Mart, Cardiff ITEC, Aberdeen ITEC, BITEC (Basildon), Stoke ITEC, Distel, LABBS Surrey, and CBBS South West. That is 12 databases in all, leaving 20



spare for your use. Of course, there is no reason why you need to keep the ones supplied.

The main terminal software is partly menu-driven and partly single-key-entry driven. From the top level you can auto-dial, edit the directory of numbers, back-up the software, initiate file

transfer between two QLs, set the terminal interface characteristics, switch on a logging option, save screen pictures in QL memory format or log format, transmit a text file to an on-line database, set the terminal screen width, initiate multi-tasking alongside SuperBasic, or go for 1,200 baud half-duplex transmission.

When backing-up the terminal software you will save the current characteristics of the terminal software automatically, such as newly-edited auto-dial numbers. As such it is not just a back-up operation. It is an essential operation to perform if you want to use a particular set of characteristics continuously.

One of the interface options is to select LOCAL, ON-LINE or ON+ECHO operations. LOCAL mode is useful for when you wish to view logged – i.e. saved – pages on Microdrive or disc. It also allows you to create and edit a viewdata 'picture + text' type of screen. A separate utility can then be used to convert that page into the appropriate message-type file, ready for transmission to an on-line database.

If you are new to viewdata-type screen layouts you could do worse than look at the graphics display pages stored in the ITCU *Exchange and mart* databases. You can see how to draw a black cat in a coal cellar, various portraits, Greenpeace advertisements, and also what Jan somebody or other on a night out looks like.

In terms of value I think the Miracle modem is aptly-named. In terms of cost the nearest rival is the Prism 1000 at £59.00, though that is a manual dial system only. Next is the Tandata – Qmod, Qcall and Qconnect – at £79.99. Last month the Astracom 1000 was reviewed and is reasonably-priced at £194.95. That was a fair comment in that the Astracom offers a little more sophistication – you get a 6K buffered serial-to-parallel printer interface and the modem can sample communication protocols and set itself automatically.

There is also the added software bonus of some full graphics printer dump routines. It depends, I suppose, on what you want. If you want to hook to on-line databases or join the Prestel/Micronet set at minimum cost, I know which modem I would choose – and it would not take a Miracle to figure which that is.

# BETTER BASIC

As well as helping to improve your programming technique, Better Basic looks at broader aspects of SuperBasic. This month Mike Lloyd writes about Structure.

**T**here has been much praise for SuperBasic because it is a structured language, a rare distinction in the home computer world, and it is rarely disputed that structured languages are somehow superior to unstructured ones. Pundits have been known to use structured programming as a synonym for good programming, which tends to make Spectrum owners feel unnecessarily inferior. Some of the pundits' pronouncements and many of the programs published in structured languages, however, reveal that structured programming is sometimes misunderstood and often not put into practice.

A simple definition of structure in computer programming terms is the way in which program segments are combined to make programs; it describes the internal organisation of a program. In normal English usage, structure implies a framework, orderliness, cohesion and pattern, but applied to computer programming the word has a more special sense.

Writing short programs may not require special organisation other than starting at the beginning and progressing line by line until the end is reached. Of course, if a

repetitive task is to be performed or decisions taken, the flow of the program can be re-directed by FOR . . . NEXT loops or IF . . . THEN statements. That undoubtedly represents a kind of structure but it is not by itself what computer users have come to expect from a structured language.

As longer, larger and more complicated programs are developed, problems arise because of sheer size. The variables area consumes large quantities of valuable RAM, the flow of the program can shift dramatically from one end of a listing to the other, and the programmer cannot remember all the subroutines, their location in the listing or the names of the appropriate variables.

More memory is used by lengthy documentation in REMark statements. Errors, bugs and false logic creep in and bedevil the hapless programmer until more time is spent correcting mistakes than developing new code. REPEAT, FOR . . . NEXT, SElect ON and IF . . . THEN constructs and GOSUB and GOTO commands do nothing to ease the burden.

What has led to the salvation of the harassed programmer and what has come to be meant by the term structure is the

ability to write programs in small and largely independent segments. Instead of struggling with a mammoth 800-line program the programmer can instead write 40 routines averaging 20 lines in length.

The facility to write short routines and combine them into programs requires certain qualities of the computer and of the programmer. The computer must have a language in which procedures and functions can be defined by the programmer, using locally-declared variables, and referred to by meaningful names. In SuperBasic full structure is provided by the DEFine PROCEDURE, DEFine FuNction RETurn and LOCAL keywords with the associated recursion, parameter passing and coercion facilities. SuperBasic provides many other useful, original, powerful and unusual facilities but they do not necessarily go towards making it a better structured language.

In sum, a structured program needs to be written in a suitable language by a programmer who understands the programming strategy involved. A mess of GOSUB and GOTO statements strewn in yards of impenetrable listings is not structured, even if it is written in

SuperBasic, just as a carefully-planned, well-documented and neatly-executed program written in Spectrum Basic is not structured.

The question remains whether structured programming is the same as good programming? While there are many who would give unqualified assent, it is not such an easy question to answer. It is by no means easy to determine what constitutes good programming but here is a set of criteria by which programs might be judged, together with an appraisal of the relevance of structuring techniques to each criterion.

The ultimate test of a good program is its ability to perform the job intended. Any shortcomings, restrictions or implementation errors detract from the effectiveness of a program. That ugly and over-used phrase user-friendliness is an important consideration; illogical menu options, complicated keyboard operations or lethal bugs destroy the credibility and usefulness of a program.

The final judge of success is not the programmer but the user, who is usually completely unaware of the internal organisation of the program. It is always possible to write two programs, one structured and one not, which



# KEYWORDS OF THE MONTH

## DIM & DIMN

This month two closely-linked keywords are described. Both relate to arrays and therefore a brief introduction to the subject might be helpful. Traditionally, Basics have only two data structures, variables and arrays; SuperBasic is no different.

Arrays differ from variables in that they hold as many values as the programmer specifies, memory permitting. Like variables, they can be integer, real number or string in type and they are referred to by a name. Parts of the array are denoted by subscripts in brackets after the array name, such as in the following statements:  
**PRINT number(12)**  
**Var\$ = string\$(5,11)**  
**INPUT #3,**  
**integer%(4,3,9)**

The basic part of an array is called an element, which holds a single value or character. They

can be arranged into a one dimension column — or row — a two-dimensional matrix, or any larger number of dimensions. Complicated array slicing can be achieved but space precludes a full explanation.

### DIM

To establish an array it is necessary to tell the interpreter how many dimensions and how many elements there are in each dimension. That is achieved with a DIM statement followed by the array name and, in brackets, the size of each dimension. For example:  
**120 DIM a\$(12,14)** establishes a string array called a\$ which has 12 strings each a maximum of 14 characters long. Multiple declarations are allowed, for instance:  
**130 DIM info(12,20), string\$(42,6), integer%(112)**  
SuperBasic arrays have

a zero element which can be used normally in number arrays but in string arrays they are reserved to hold the number of characters held in the string. This feature is used in the program below.

String arrays are also unusual in that their final dimensions always have an even number of elements. This is proved by the following short program:

```
500 FOR X = 1 TO 20
510 DIM A$(X)
520 A$ = FILL$ ("*",
20)
530 PRINT A$(0),A$
540 END FOR X
```

DIM also has a strange quirk. If a DIM statement is added to a program but the program is not run, any use of the array name before the DIM statement is read by the interpreter will result in an error message. Try entering this:  
**150 DIM fault(10)**  
**PRINT fault**

Once RUN has been entered the print command will work normally.

Within user-defined procedures and functions, local arrays are declared by suffixing the dimension sizes after the array name in a LOCAL statement, e.g.:  
**900 DEFine PROCEDURE spoof (x,y)**  
**910 LOCAL array\$(4,7)**  
**920 . . . .**

### DIMN

DIMN is a function which is used to detect how large each dimension of an array is. Two syntaxes are allowed. The most useful is:  
**PRINT DIMN (var\$, 3)** which will print the number of elements in the third dimension of the array var\$. The same result can be achieved by this syntax:  
**PRINT DIMN (var\$(1,1))**

appear identical to the user. Therefore the use or absence of a structured programming technique is irrelevant to this, the most important aspect of program design.

Execution speed might be important in some applications but it is here that structured programming works against the programmer. Calling-up a procedure or function, even recursively, is often slower than using a GOTO or GOSUB and always slower than not interrupting the program flow at all. That is specially true in short programs. For simple tasks, it is usually preferable to include the commands each time they are required than place them once in the procedure. It is possible to write a procedure to increment a variable,

such as:  
**DEFine PROCEDURE INCR (number):**  
**number = number + 1:**  
**END DEFine**

Then, each time a variable was to be increased by one a statement such as this could be written:  
**IF variable < 10 THEN INCR variable**

This command takes much longer to carry-out than the simple:  
**IF variable < 10 THEN variable = variable + 1**

It is only when the writing of the program is considered that the advantages of structuring become clear. Structured programs are easier to plan than ordinary Basic programs. Imagine designing a simple game. The program can be divided into different subroutines to initialise the variables, present a menu of options, draw

the screen, play the game, display the score and find if the user would like another attempt. In SuperBasic, the main loop of the program could be written immediately:  
**100 REPEAT game**  
**110 initialise**  
**120 menu**  
**130 draw-screen**  
**140 play**  
**150 roll-of-honour**  
**160 IF quit THEN EXIT game**  
**170 END REPEAT game**

The procedure names, carefully chosen, document the program as it develops, which makes it very easy to avoid major errors of logic. Having established the main structure of the program, each constituent can be considered in turn and itself broken down into logical segments.

Not only is it easier for the author of the program to become re-acquainted

with a program but it is also relatively easy for a newcomer, reading a program in a magazine, for example, to see how it works.

Because of the independence of structured program segments, it is feasible to build a library of useful routines which can be incorporated without amendment into a variety of programs, thus saving programming effort. It is necessary to invent the wheel only once.

So, structured programming techniques have little to do with making user-friendly or efficient programs. Once programmers are used to using structured techniques, ordinary Basics can lose their appeal completely and then SuperBasic becomes the only dialect worth taking seriously.

# P + R = O G S

If you have a program that is worthy of consideration, send it to 'The Progs', Sinclair QL World, 79-80 Petty France, London SW1H 9ED. We pay for everything published at the usual page rates — £80 per thousand words.

## Darts K. Judson

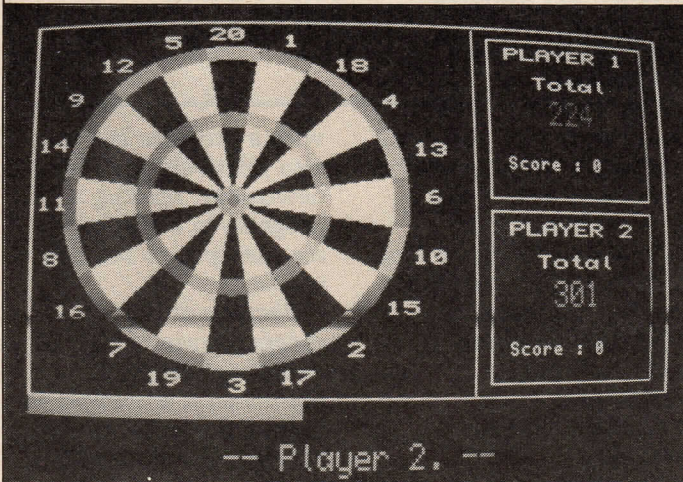
The program of the month for this issue is an extremely playable *Darts* simulation game.

It requires a great deal of skill and the author has included many realistic features, such as allowing the players to finish only on a double and discounting scores if they exceed the number of points needed to complete the game.

Darts are aimed by using

the CTRL and ALT keys to stop a moving horizontal and vertical line displayed at the edge of the screen. The cross-over point of these two axes is where the dart will hit the board.

The computer keeps a running total of the score and also calculates in how many throws each player completes the game, with the record in our offices standing at nine.



```

320 NEXT F
330 DEFine PROCedure angle
340 z=43:x=4:angles:plotter
350 z=39:x=0:plotter
360 z=24:x=2:plotter
370 z=20:x=0:plotter
380 END DEFine
390 DEFine PROCedure angle2
400 z=43:x=2:angles:plotter
410 z=39:x=7:plotter
420 z=24:x=4:plotter
430 z=20:x=7:plotter
440 FILL 1:INK 4:CIRCLE 51,50,4:FILL 0
450 INK 2:FILL 1:CIRCLE 51,50,1.5:FILL 0
460 END DEFine
470 DEFine PROCedure angles
480 b=cos(a):c=sin(a)
490 a=a+PI/10:d=cos(a):e=sin(a)
500 END DEFine
510 DEFine PROCedure plotter
520 FILL 1
530 INK x
540 ARC 51+b*z,c*z+50 TO d*z+51,e*z+50,PI/10:LINE
    TO 51,50:LINE TO 51+z*b,50+z*c
550 FILL 0
560 END DEFine
570 numbers
580 DEFine PROCedure numbers
590 CSIZE 2,0
600 OVER 1:INK 7
610 DATA 119,2,20,167,6,1,200,20,18,232,40,4,252,6
    6,13,260,91,6,251,122,10
620 DATA 233,148,15,209,169,2,165,183,17,133,187,3
    79,184,19,55,170,7,15
630 DATA 151,16,7,124,8,1,95,11,1,64,14,22,39,9,44
    20,12,89,7,5
640 RESTORE 610
650 FOR ff=1 TO 20
660 READ gg, hh, ii:CURSOR gg, hh:PRINT ii
670 NEXT ff
680 OVER 0
690 END DEFine
700 LINE 111,0 TO 111,100
710 LINE 115,3 TO 115,48 TO 161,48 TO 161,3 TO 115
    ,3
720 LINE 115,97 TO 115,52 TO 161,52 TO 161,97 TO 1
    15,97
730 scores
740 DEFine PROCedure scores
750 INK 7
760 CSIZE 2,0
770 CURSOR 318,10:PRINT"PLAYER 1"
780 CURSOR 338,27:PRINT"Total"
790 CURSOR 318,107:PRINT"PLAYER 2"
800 CURSOR 338,124:PRINT"Total"
810 INK 2:CSIZE 2,1
820 CURSOR 353-(LEN(score1)*5),39:PRINT " ";score1
    ;" "
830 INK 4
840 CURSOR 353-(LEN(score2)*5),136:PRINT " ";score
    2;" "
850 CSIZE 1,0:INK 7
860 END DEFine
870 END DEFine
880 DEFine PROCedure bar
890 BLOCK #0;298,10,0,0,0:BLOCK 10,198,297,0,0
900 FOR a=0 TO 298 STEP 8+RND(4)
910 BLOCK #0; a,10,0,0,player
920 IF KEYROW(7)=2 THEN GO TO 990
930 NEXT a
940 FOR a=298 TO 0 STEP -8-RND(4)

```

```

100 PAPER 0:CLS
110 REMark 1290 end def
120 DIM name$(4,18)
130 name$(1)="Kenton Judson...10"
140 name$(2)="John Lowe.....14"
150 name$(3)="Clive Sinclair..18"
160 player = 2
170 score1=301:score2=301
180 b=1
190 go1=0:go2=0
200 c=51:d=50:e=15:f=22:g=37:h=45
210 intro
220 MODE 4
230 game
240 GO TO 160
250 DEFine PROCedure board
260 PAPER 0:INK 7
270 BORDER #1,1,7
280 a=PI/20
290 FOR f=1 TO 10
300 angle
310 angle2

```

# P+ROGS

```

1110 ON inp=192 TO 196
1120 IF df=3 OR df=4 THEN df=df-2
1130 IF odf=1 THEN df=4
1140 IF odf=2 THEN df=3
1150 ON inp=200 TO 204
1160 IF df=1 OR df=2 THEN df=df+2
1170 IF odf=3 THEN df=2
1180 IF odf=4 THEN df=1
1190 ON inp=216 TO 220
1200 IF df=2 OR df=4 THEN df=df-1
1210 IF odf=1 OR odf=3 THEN df=df+1
1220 ON inp=208 TO 212
1230 IF dvn=1 THEN
1240 AT #0,2,10:PRINT #0,"Ow! That hurt!":PAUSE
E 30
1250 AT #0,2,10:PRINT #0," "
1260 ELSE
1270 IF df=1 THEN pnx=pnx-1
1280 IF df=2 THEN pnx=pnx+1
1290 IF df=3 THEN pny=pny-1
1300 IF df=4 THEN pny=pny+1
1310 odf=0
1320 END IF
1330 END SELECT
1340 IF odf=df THEN GO TO 1070
1350 GO TO 1030
1360 END DEFine
2000 DEFine PROCedure create_maze
2010 DIM grid(w+1,h+1),pm(5),dpv(5)
2020 CLS:INK 7:rnx=RND(1 TO w):rny=RND(1 TO h):ex
=RND(3)
2030 IF ex=0 THEN trgx=1:trgy=rny
2040 IF ex=1 THEN trgx=w:trgy=rny
2050 IF ex=2 THEN trgx=rnx:trgy=1
2060 IF ex=3 THEN trgx=rnx:trgy=h
2070 x=trgx:y=trgy:n=0:grid(x,y)=2^ex
2080 FOR n=1 TO w*h-1
2090 p$=" " & INT(n/(w*h)*1000):np=LEN(p$)
2100 np$=p$(np-2 TO np-1) & "." & p$(np)
2110 AT 10,7:PRINT np$!"% of the maze built":p=0
2120 IF x>1 AND grid(x-1,y)=0 THEN p=p+1:pm(p)=1
2130 IF x<w AND grid(x+1,y)=0 THEN p=p+1:pm(p)=2
2140 IF y>1 AND grid(x,y-1)=0 THEN p=p+1:pm(p)=3
2150 IF y<h AND grid(x,y+1)=0 THEN p=p+1:pm(p)=4
2160 IF p=0 THEN
2170 x=x+1:IF x>w THEN x=1:y=y+1:IF y>h THEN y=
1
2180 IF grid(x,y)=0 THEN GO TO 2170
2190 GO TO 2120
2200 END IF
2210 r=pm(RND(1 TO p))
2220 IF r=1 THEN grid(x,y)=grid(x,y)+1:x=x-1:grid
(x,y)=2
2230 IF r=2 THEN grid(x,y)=grid(x,y)+2:x=x+1:grid
(x,y)=1
2240 IF r=3 THEN grid(x,y)=grid(x,y)+4:y=y-1:grid
(x,y)=8
2250 IF r=4 THEN grid(x,y)=grid(x,y)+8:y=y+1:grid
(x,y)=4
2260 END FOR n
2270 END DEFine

3000 DEFine PROCedure display_view
3010 dvn=0:INK 7:SCALE 100,-75,-30
3020 BLOCK 450,154,0,0,5,3,0:BLOCK 450,66,0,154,6
,0,3
3030 FOR ix=1 TO 5
3040 dpv(ix)=0
3050 IF df=1 THEN
3060 g=grid(pnx-ix+1,pny):IF g>7 THEN dpv(ix)=1
3070 IF g>3 AND (g<8 OR g>11) THEN dpv(ix)=dpv(
ix)+2
3080 IF g/2=INT(g/2) THEN dvn=ix:EXIT ix
3090 END IF
3100 IF df=2 THEN
3110 g=grid(pnx+ix-1,pny):IF g>7 THEN dpv(ix)=2
3120 IF g>3 AND (g<8 OR g>11) THEN dpv(ix)=dpv(
ix)+1
3130 IF right(g)=0 THEN dvn=ix:EXIT ix
3140 END IF
3150 IF df=3 THEN
3160 g=grid(pnx,pny-ix+1):IF g/2<>INT(g/2) THEN
dpv(ix)=1
3170 dpv(ix)=dpv(ix)+2*right(g)

```

```

3180 IF g<12 AND (g>7 OR g<4) THEN dvn=ix:EXIT
ix
3190 END IF
3200 IF df=4 THEN
3210 g=grid(pnx,pny+ix-1):IF g/2<>INT(g/2) THEN
dpv(ix)=2
3220 dpv(ix)=dpv(ix)+right(g):IF g<8 THEN dvn=i
x:EXIT ix
3230 END IF
3240 END FOR ix
3250 np=dvn:IF dvn=0 THEN dvn=6:np=5
3260 xc=58*(2/3)^(np-1)*2:ytic=14*xc/15:ybc=-2*x
c/5
3270 IF dvn=6 THEN
3280 FILL 1:INK 0,3,3
3290 LINE 0,0 TO xc,ytc:LINE 0,0 TO xc,ybc:LINE
xc,ytc TO xc,ybc
3300 FILL 1
3310 LINE 0,0 TO -xc,ytc:LINE 0,0 TO -xc,ybc:LIN
E -xc,ytc TO -xc,ybc
3320 GO TO 3370
3330 END IF
3340 FILL 1:INK 6,2,3:LINE -xc,ytc TO xc,ytc:LINE
-xc,ybc TO xc,ybc
3350 LINE xc,ytc TO xc,ybc:LINE -xc,ytc TO -xc,yb
c
3360 IF pnx=0 OR pnx>w OR pny=0 OR pny>h THEN do_
exit
3370 REPEAT xcoord
3380 cocalc:cdv=dpv(np):INK 6,2,3
3390 IF cdv=2 OR cdv=3 THEN
3400 FILL 1:LINE oxc,oyt TO oxc,oyb:LINE oxc,oy
t TO xc,oyt
3410 LINE oxc,oyb TO xc,oyb:LINE xc,oyt TO xc,o
yb
3420 END IF
3430 IF cdv=1 OR cdv=3 THEN
3440 FILL 1:LINE -oxc,oyt TO -oxc,oyb:LINE -oxc
,oyt TO -xc,oyt
3450 LINE -oxc,oyb TO -xc,oyb:LINE -xc,oyt TO -
xc,oyb
3460 END IF
3470 INK 2,4,0
3480 IF cdv=0 OR cdv=1 THEN
3490 FILL 1:LINE oxc,oyt TO oxc,oyb:LINE oxc,oy
t TO xc,ytc
3500 LINE oxc,oyb TO xc,ybc:LINE xc,ytc TO xc,y
bc
3510 END IF
3520 IF cdv=0 OR cdv=2 THEN
3530 FILL 1:LINE -oxc,oyt TO -oxc,oyb:LINE -oxc
,oyt TO -xc,ytc
3540 LINE -oxc,oyb TO -xc,ybc:LINE -xc,ytc TO -
xc,ybc
3550 END IF
3560 cocalc:FILL 1:LINE oxc,oyt TO oxc,oyb:LINE
oxc,oyt TO xc,ytc
3570 LINE oxc,oyb TO xc,ybc:LINE xc,ytc TO xc,yb
c
3580 FILL 1:LINE -oxc,oyt TO -oxc,oyb:LINE -oxc
,oyt TO -xc,ytc
3590 LINE -oxc,oyb TO -xc,ybc:LINE -xc,ytc TO -x
c,ybc
3600 FILL 0:np=np-1:IF np=0 THEN EXIT xcoord
3610 END REPEAT xcoord
3620 END DEFine

4000 DEFine PROCedure display_maze
4010 IF h>w/1.5 THEN
4020 sq=INT(220/h):sf=220:h1=220:w1=sq*w
4030 ELSE sq=INT(450/w):sf=300:h1=sq*h:w1=450
4040 END IF
4050 px=sf*.75-w1/2:py=sf/2-h1/2:SCALE sf,0,0:PAP
ER 0:INK 7:CLS:CLS #0
4060 FOR y=1 TO h
4070 FOR x=1 TO w
4080 g=grid(x,y):l=(x-1)*sq+px:r=1+sq:t=h1-(y-1
)*sq+py:b=t-sq
4090 IF g/2=INT(g/2) THEN LINE 1,t TO 1,b
4100 IF g<8 THEN LINE 1,b TO r,b
4110 IF y=1 AND g<12 AND (g>7 OR g<4) THEN LINE
1,t TO r,t
4120 IF x=w THEN
4130 FOR z=0 TO 12 STEP 4

```



```

2410 PRINT" the bar at the bottom of the sc
reen is in the appropriate horizontal
position ). ";
2420 PRINT"Then do the same for the vertical p
osition, but press the ~";
2430 INK 2:PRINT"ALT";:INK 5:PRINT"~ button."
2440 CSIZE #0;2,1:PRINT #0;" ... Press A Key ..
"
2450 PAUSE 50
2460 IF INKEY$="-" THEN GO TO 2460
2470 CLS #0
2480 END DEFine

```

## Multimaze Edward Leigh

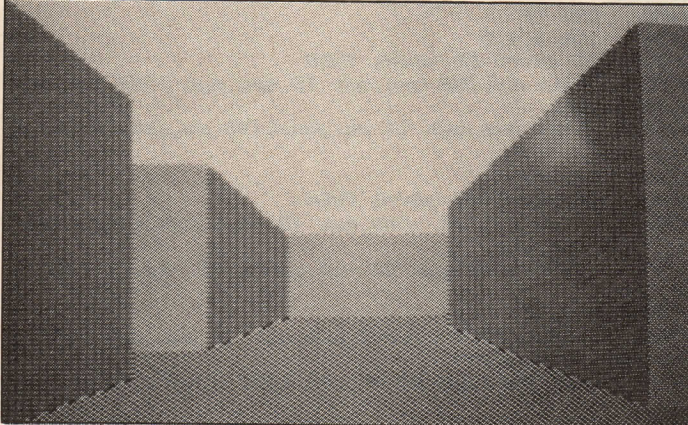
This program is a three-dimensional maze game, with the obvious object of getting out of the maze. The maze can be constructed to your requirements, with the maximum size being a 10 x 10 square. Once in the maze you are left alone and have to wander about it, using the cursor keys to advance, turn back or move left or right.

It proves extremely difficult to get out of the maze,

which perhaps is its most realistic feature, as anyone who has spent frustrating hours at Hampton Court will testify.

While there is a map to refer to, once you have looked at it a new maze is drawn so that you are equally lost, which seems to be rather pointless.

That is the only major criticism of an otherwise well-written and extremely playable program.



```

10 REMark ##### MULTI-MAZE by Edward Leigh
12 REMark ##### Written for the Sinclair QL
14 REMark ##### Completed on the 5/9/84
16 :
18 REMark ** An explanation of the variable names
might be useful: **
20 REMark ** x/xco/y/yco in a name :the x/y coordi
nate of the maze **
22 REMark ** grid(x,y) :the maze matrix
x **
24 REMark ** A '1' in the above matrix means one
can go left only **
26 REMark ** A '2' ... right; '4' ... up; '8' ...
down **
28 REMark ** Multiple directions use the sum of th
e relevant numbers **
30 REMark ** w1/h1 :width & height
of maze in the **
32 REMark ** screen graphic
s scale **

```

```

34 REMark ** sq :width of each
square in above scale**
36 REMark ** px/py :pos. of bottom
-left corner of maze **
38 REMark ** trgx/trgy :target coordin
ates (i.e. the exit) **
40 REMark ** df :direction you
are facing in maze **
42 REMark ** A '1' means left; '2' : right; '3' :
up; '4' : down **
44 REMark ** stx/sty :Your starting
position **
46 REMark ** pnx/pny :Your position
in the maze **
48 REMark ** dvn :The length of
your view, in cells **
50 REMark ** dpv(number) :Your view at c
ell distance-number **
52 REMark ** number=1 :a left turn; num.=2 :a righ
t turn; num.=3 :both **
54 REMark ** xc/ytc/ybc :screen coordnt
s. for plotting view **
56 REMark ** oxc/oxt/oyb :previous coord
inates **
58 :
60 :
100 CLEAR:MODE 8:OPEN #1,con_450x220a40x16_10:PAPE
R 0:PAPER #2,0
110 CLS#2:CLS#0:CLS:INK 4:PRINT "WELCOME to ...":
PAUSE 25
120 INK 7:UNDER 1:AT 2,2:PRINT "MULTI-MAZE - The M
aze Program !"
130 AT 4,3:PRINT "Press:":UNDER 0:PRINT:PRINT "'P'
to play the game"
140 PRINT:PRINT "'D' to display a maze"
150 PRINT:PRINT "'F' to finish the program"
160 inp$=INKEY$(-1):IF inp$="F" THEN CLS:STOP
170 IF inp$<>"d" AND inp$<>"p" THEN GO TO 160
180 AT 14,2:PRINT "Please enter:":w=0:h=0:PRINT
190 PRINT"The width of the maze, in cells"
200 INPUT "(e.g. 10) : ";w:IF w<1 THEN GO TO 180
210 AT 19,0:PRINT "The depth of the maze, in cells"
220 INPUT "(e.g. 5) : ";h:IF h<1 THEN GO TO 210
230 IF inp$="p" THEN
240 CLS:UNDER 1:PRINT "The object of the game is
...":UNDER 0:PRINT
250 PRINT "You have to move about a maze to find"
260 PRINT "the exit, which you will recognise":UN
DER 1:PRINT "only";
270 UNDER 0:PRINT " when you're right at it."
280 PRINT "Pressing 'T' will allow you to see"
290 PRINT "the whole maze. Of course you can't"
300 PRINT "go back inside: that'd be cheating !"
310 UNDER 1:PRINT:PRINT "The controls are ...":UN
DER 0:PRINT
320 PRINT "The 'Cursor Up' key moves you forward"
330 PRINT:PRINT "The 'Cursor Left' key turns you.
left (on the spot)"
340 PRINT:PRINT "The 'Cursor Right' key turns you
"
350 PRINT "right (on the spot)":PRINT
360 PRINT "The 'Cursor Down' key turns you"
370 PRINT "backwards (on the spot)"
380 AT #0,3,7:PRINT #0,"Press any key to start":z
$=INKEY$(-1)
390 CLS #0:CLS:AT 10,9:PRINT "Don't get lost !":P
AUSE 50
400 control_program:RUN
410 END IF
420 create_maze:display_maze:RUN
1000 DEFine PROCEDURE control_program
1010 CLS:create_maze
1020 stx=RND(1 TO w):sty=RND(1 TO h):df=RND(1 TO
4):pnx=stx:pny=sty
1030 display_view
1040 IF pnx=0 OR pnx>w OR pny=0 OR pny>h THEN
1050 AT #0,2,6:PRINT #0,"You've seen the light !
!":PAUSE 200:GO TO 1100
1060 END IF
1070 inp=CODE(INKEY$(-1)):odf=df
1080 SElect ON inp
1090 ON inp=116 TO 180
1100 display_maze:RUN

```

# PROGS

```

950 BLOCK #0;298-a,10,a,0,0
960 IF KEYROW(7)=2 THEN GO TO 990
970 NEXT a
980 BLOCK #0;298,10,0,0,0:GO TO 900
990 w=a*28/75
1000 FOR a=0 TO 198 STEP 5
1010 BLOCK 10,a,297,0,player
1020 IF KEYROW(7)=4 THEN GO TO 1090
1030 NEXT a
1040 FOR a=198 TO 0 STEP -5
1050 BLOCK 10,198-a,297,a,0
1060 IF KEYROW(7)=4 THEN GO TO 1090
1070 NEXT a
1080 BLOCK 10,198,297,0,0:GO TO 1000
1090 y=100-(a*100/198)
1100 v=ATAN((y-50)/(w-51))
1110 u=SQR((y-50)^2+(w-51)^2)
1120 v=ACOS((w-51)/u)
1130 printer
1140 scorer
1150 END DEFine
1160 DEFine PROCedure scorer
1170 RESTORE 1180
1180 DATA 6,13,4,18,1,20,5,12,9,14,11,8,16,7,19,3,
17,2,15,10,6,25,50
1190 t=INT((v+PI/20)/(PI/10))+1
1200 IF y-50<0 THEN GO TO 1250
1210 FOR s=1 TO t
1220 READ r
1230 NEXT s
1240 GO TO 1280
1250 RESTORE 1260
1260 DATA 6,10,15,2,17,3,19,7,16,8,11
1270 GO TO 1210
1280 q=1
1290 IF u>43 THEN q=0
1300 IF u<=43 AND u>39.5 THEN q=2
1310 IF u<=24 AND u>20.5 THEN q=3
1320 IF u<=4 THEN r=25
1330 IF u<1.5 THEN r=25:q=2
1340 END DEFine
1350 DEFine PROCedure printer
1360 INK 7
1370 FOR so=24 TO 10 STEP -1 :BEEP 50,so
1380 FILL 1:CIRCLE w,y,2.5:FILL 0
1390 INK 0
1400 LINE w-2,y-2 TO w+2,y+2
1410 LINE w-2,y+2 TO w+2,y-2
1420 END DEFine
1430 DEFine PROCedure update
1440 scores
1450 CSIZE 1,0
1460 CURSOR 320,72: PRINT "Score : ";go1;" "
1470 CURSOR 320,169:PRINT "Score : ";go2;" "
1480 numbers
1490 END DEFine
1500 DEFine PROCedure game
1510 REMark *****
1520 REMark ***** The main body *****
1530 REMark *****
1540 DIM l(3)
1550 DIM k(6)
1560 PAPER 0:CLS
1570 CSIZE #0;2,1
1580 goes=0
1590 board
1600 CLS#0: INK #0,player:PRINT#0;
1610 PRINT #0;" -- Player ";player/2;"
--"
1620 FOR p=1 TO 3
1630 bar
1640 k(p*2-1)=w:k(p*2)=y
1650 IF player=2 THEN go1=go1+r*q:update
1660 IF player=4 THEN go2=go2+r*q:update
1670 IF score1-go1=0 AND q=2 THEN win:END DEFine
1680 IF score1-go1<=1 THEN go1 =0:l(p)=r :GO TO 17
40
1690 IF score2-go2=0 AND q=2 THEN win:END DEFine
1700 IF score2-go2<=1 THEN go2=0:l(p)=r:GO TO 1740
1710 l(p)=r
1720 NEXT p
1730 IF player =4 THEN goes=goes+3
1740 IF player=2 THEN score1=score1-go1
1750 IF player=4 THEN score2=score2-go2

```

```

1760 FOR n=1 TO 3
1770 RESTORE 1180:READ m:FOR o=1 TO 22
1780 READ m
1790 IF m<>1(n) THEN NEXT o:GO TO 1770
1800 INK 0:FILL 1:CIRCLE k(n*2-1),k(n*2),2.5:FILL
0:INK 7
1810 a=(o-2)*PI/10+PI/20
1820 IF (o-1)/2<>INT((o-1)/2) THEN angle:angle2:an
gle:GO TO 1840
1830 angle2:angle:angle2
1840 NEXT n
1850 go1=0:go2=0:update
1860 player=6-player
1870 GO TO 1600
1880 END DEFine
1890 DEFine PROCedure win
1900 FOR n=1 TO 50
1910 SCROLL -2:SCROLL -2
1920 NEXT n
1930 MODE 8
1940 INK 2:PAPER 0:CSIZE 2,1
1950 CLS
1960 goes=goes+p
1970 PRINT:PRINT" -- DARTS --"
1980 INK 6
1990 PRINT:CSIZE 2,0:PRINT" By Kenton B.G.
Judson."
2000 INK 5
2010 PRINT :PRINT:PRINT" Player ";player/2;" wo
n in ";goes;" throws."
2020 PRINT" Well done! Player ";3-player/2;" st
ill had"
2030 PRINT " to throw another ";
2040 IF player=2 THEN PRINT;score2;:GO TO 2060
2050 PRINT score1;
2060 PRINT" points."
2070 PRINT #0;" Press a key to continue..."
2080 IF INKEY$="" THEN GO TO 2080
2090 IF goes >name$(3,17 TO 18) THEN GO TO 2200
2100 PRINT:INK 4:PRINT" This is a great sco
re!!"
2110 PRINT" What is your name (max 15 chrs.)"
2120 DIM nameeg$(17)
2130 INK 3
2140 INPUT" ... "; nameeg$:IF LEN(nameeg$)>15 TH
EN GO TO 2140
2150 name$(4,1 TO 16)="....."
2160 name$(4,1 TO LEN(nameeg$))=nameeg$:name$(4,17
TO 18)=goes
2170 name$(3,1 TO 18)=name$(4,1 TO 18)
2180 IF goes<name$(2,17 TO 18) THEN name$(3,1 TO 1
8)=name$(2,1 TO 18):name$(2,1 TO 18)=name$(4,1 TO
18)
2190 IF goes<name$(1,17 TO 18) THEN name$(2,1 TO 1
8)=name$(1,1 TO 18):name$(1,1 TO 18)=name$(4,1 TO
18)
2200 PAPER 0:INK 3
2210 CLS:CLS#0
2220 PRINT:PRINT" HI-SCORE"
TABLE"
2230 PRINT"
2240 INK 5
2250 PRINT:PRINT" * * *":PRINT
2260 PRINT:PRINT:INK 2:PRINT" 1) ";name$(1)
2270 PRINT:PRINT:INK 4:PRINT" 2) ";name$(2)
2280 PRINT:PRINT:INK 6:PRINT" 3) ";name$(3)
2290 PRINT #0;" Press a key to start again..."
2300 IF INKEY$="" THEN GO TO 2300
2310 CLS:CLS#0
2320 END DEFine
2330 DEFine PROCedure intro
2340 INK 0:INK 2:MODE 8:CLS
2350 CSIZE 0,0:PRINT" K.B.G.Judson.
(1986)":PRINT:INK 6
2360 CSIZE 2,1:PRINT" DARTS":CSIZE
0,0:PRINT"
2370 INK 4:PRINT:PRINT" The rules to this game
are the same as the normal game.";
2380 PRINT"The only difference being that thi
s is a computer simulation."
2390 INK 5:PRINT" To throw a dart you must firs
t aim the dart by pressing the ";
2400 PRINT"~";:INK 2:PRINT"CTRL";:INK 5:PRINT"~ bu
tton (When";

```

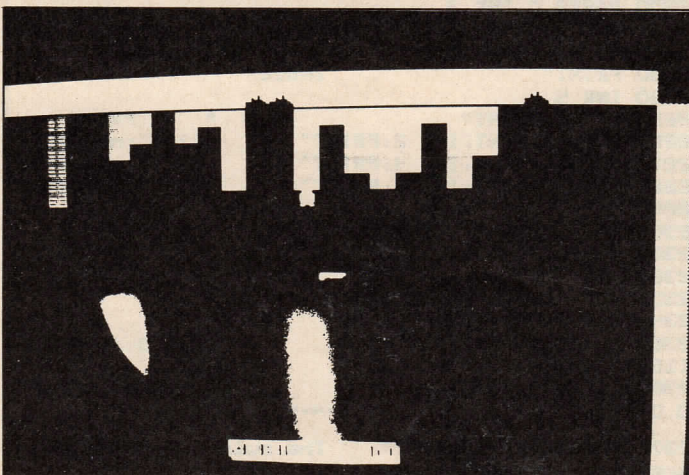


```

4114      IF g=z OR g=z+1 THEN LINE r,t TO r,b
4150      END FOR z
4160      END IF
4170      END FOR x
4180      END FOR y
4190      IF inp$="p" AND sf/sq<22 THEN
4200      scrco stx-.5,sty-.5:PRINT "s"
4210      IF pnx>0 AND pnx<=w AND pny>0 AND pny<=h TH
EN
4220      OVER 1:scrco pnx-.5,pny-.5:PRINT "*" :OVER
0
4230      AT #0,3,7:PRINT #0,"*': Where you stopped
"
4240      END IF
4250      AT #0,2,7:PRINT #0,"'s': Where you started"
:PAUSE 200
4260      AT #0,2,7:PRINT #0,FILL$( " ",22):AT #0,3,7:
PRINT #0,FILL$( " ",22)
4270      END IF
4280      AT #0,2,2:PRINT #0,"Press any key to return
to the menu"
4290      z$=INKEY$(-1)
4300      END DEFine
5000      DEFine FuNction right(co)
5010      ans=0
5020      FOR z=2 TO 14 STEP 4
5030      IF co=z OR co=z+1 THEN ans=1
5040      END FOR z
5050      RETURN ans
5060      END DEFine
5100      DEFine PROCedure cocalc
5110      oxc=xc:xc=xc*1.5:oyt=ytc:oyb=ybc:ytc=14*xc/1
5:ybc=-2*xc/5
5120      END DEFine
5200      DEFine PROCedure scrco(cnx,cny)
5210      CURSOR (px+sq*cnx)/(sf*1.5)*450-8,(py+sq*cny
)/sf*220-7
5220      END DEFine
5300      DEFine PROCedure do_exit
5310      BLOCK 80,100,185,105,7:FILL 1:INK 2:LINE -13
.5,22 TO -13.5,-23
5320      LINE -13.5,22 TO 0,17:LINE 0,17 TO 0,-20:LIN
E 0,-20 TO -13.5,-23
5330      FILL 1:INK 0:CIRCLE -2,0,1.5,1,0:FILL 0:INK
7
5340      END DEFine

```

## Bomber D. Marsh



Unlike *Multimaze*, *Bomber* is definitely a race against time. As the pilot of a small aircraft you have to land it safely.

This sounds very simple but the game is complicated by the fact that before you can land the city of skyscrapers

has to be reduced to a pile of the towers below successful-smoking rubble. Each time the aircraft flies across the screen it loses altitude, thus getting nearer to the tall buildings, so it becomes very difficult to complete your mission without destroying the towers below successfully. In theory this all sounds extremely simple but in practice it proves difficult, so be prepared to find yourself playing just one more game until the early hours of the morning—or beyond.

```

100 REMark BOMBER-VERSION 5
110 :
120 MODE 8:CLOSE#2:WINDOW#1,480,256,25,0:INTRO:SKI
LL:WAIT:INIT_GRAPH
130 INIT:SETUP
140 REPEAT MOVE_PLANE
150 MOVE_RIGHT:IF D%=24:WIN
160 MOVE_LEFT:IF D%=24:WIN
170 END REPEAT MOVE_PLANE
180 :
190 DEFine PROCedure MAINWIN
200 PAPER 2,7,1:CLS:BLOCK 385,130,40,78,0:OPEN#3,S
CR_385x130a60x80
210 PAPER#3,7:CLS#3
220 END DEFine MAINWIN
230 :
240 DEFine PROCedure TOPWIN
250 BLOCK 200,23,114,28,0:OPEN#4,SCR_200x23a135x30
:PAPER#4,7:CLS#4
260 CSIZE#4,3,1:INK#4,1:PRINT#4," QL BOMBER":CLOS
E#4
270 END DEFine TOPWIN
280 :
290 DEFine PROCedure INTRO
300 MAINWIN:TOPWIN:INK#3,0
310 PRINT#3"\ " USE YOUR SKILL AND JUDGEMENT"\
320 PRINT#3," TO DROP THE BOMBS FROM YOUR"\
330 PRINT#3," AIRCRAFT ONTO THE CITY BELOW"\
340 PRINT#3," BEFORE YOUR PLANE CRASHES"\
350 PRINT#3," INTO ONE OF THE BUILDINGS.YOU"\
360 PRINT#3," HAVE AN UNLIMITED SUPPLY OF"\
370 PRINT#3," OF BOMBS IN THE GAME PRESS"\
380 PRINT#3," THE SPACE BAR TO RELEASE ONE"\:PRIN
T#3," BOMB"\
390 INK#3,4:FLASH#3,1:PRINT#3," ANY KEY TO CO
NTINUE":FLASH#3,0:PAUSE
400 END DEFine INTRO
410 :
420 DEFine PROCedure WAIT
430 CLS#3:INK#3,1:FLASH#3,1:AT#3,4,5:PRINT#3,"P L
E A S E W A I T":FLASH#3,0:CLOSE#3
440 END DEFine WAIT
450 :
460 DEFine PROCedure INIT_GRAPH
470 DATA -5245,-10109,-7806,-11646
480 DATA -6783,1665,2,0,8769,8316
490 DATA 0,0,9264,18432,8834,-11524,128
500 DATA 22664,-20228,32,26350,28672,20085
510 DO_GRAPH=RESPR(100):RESTORE 470
520 FOR I=DO_GRAPH TO DO_GRAPH+22*2 STEP 2:READ B:
POKE W I,B
530 C_IAB=RESPR(32*8)
540 DEF_GRAPH 0,2,1,255,153,255,153,255,153,255,25
5
550 DEF_GRAPH 1,7,0,0,0,0,128,222,255,0,0
560 DEF_GRAPH 2,7,0,0,0,0,1,123,255,0,0
570 DEF_GRAPH 3,0,0,0,0,0,0,0,0,0,0
580 DEF_GRAPH 4,1,0,36,24,60,60,60,60,24,24
590 DEF_GRAPH 5,6,0,145,90,60,254,127,60,90,145
600 DEF_GRAPH 6,2,0,0,16,121,102,252,94,59,254
610 DEF_GRAPH 7,4,0,0,0,0,128,195,235,239,255
620 END DEFine INIT_GRAPH
630 :
640 DEFine PROCedure DEF_GRAPH(S%,F%,B%,RO%,R1%,R2
%,R3%,R4%,R5%,R6%,R7%)
650 LOCAL A,FH%,FL%,BH%,BL%:A=C_IAB+32*S%
660 FH%=(F% DIV 4)*2:FL%=F% && 3
670 BH%=(B% DIV 4)*2:BL%=B% && 3
680 CHARLINE(RO%):CHARLINE(R1%):CHARLINE(R2%):CHAR
LINE(R3%)
690 CHARLINE(R4%):CHARLINE(R5%):CHARLINE(R6%):CHAR
LINE(R7%)

```

```

700 END DEFine DEF_GRAPH
710 :
720 DEFine PROCEDURE CHARLINE(R%)
730 LOCAL M%,J,I,DL%,DH%:M%=128
740 FOR J=1 TO 2
750 DL%=0:DH%=0
760 FOR I=1 TO 4
770 IF (R% && M%)=M% THEN DL%=FH%+DL%*4:DH%=FL%+DH%
%*4:ELSE DL%=BH%+DL%*4:DH%=BL%+DH%*4
780 M%=M% DIV 2
790 END FOR I
800 POKE A,DL%:POKE A+1,DH%:A=A+2
810 END FOR J
820 END DEFine CHARLINE
830 :
840 DEFine PROCEDURE GRAPH(X%,Y%,S%)
850 CALL DO_GRAPH,X%,Y%,S%,C_IAB
860 END DEFine GRAPH
870 :
880 DEFine PROCEDURE SKILL
890 CLS#3:INK#3,1:PRINT#3"\ [PRESS 'T' FOR TRAIN
EEJ"\
900 PRINT#3," [PRESS 'S' FOR STANDARDJ"\
910 PRINT#3," [PRESS 'E' FOR EXPERTJ"\
920 INK#3,0:PRINT#3,"PRESS THE KEY FOR THE SKILL"\
930 PRINT#3," LEVEL THAT YOU WANT."
940 REPEAT KEYS
950 POKE 163976,1:S%=CODE(INKEY$( -1))
960 IF S%=69:DIFF%=7:EXIT KEYS
970 IF S%=83:DIFF%=12:EXIT KEYS
980 IF S%=84:DIFF%=17:EXIT KEYS
990 END REPEAT KEYS
1000 END DEFine SKILL
1010 :
1020 DEFine PROCEDURE SETUP
1030 PAPER 0:CLS:BLOCK 110,10,168,16,5:OPEN#5,SCR_
110x10a195x18
1040 PAPER#5,6:CLS#5:INK#5,0:PRINT#5,"QL BOMBER":C
LOSE#5
1050 FOR A=5 TO 26
1060 FOR B=RND(DIFF% TO 25) TO 24
1070 GRAPH A,B,0
1080 END FOR B
1090 END FOR A
1100 GRAPH C%,D%,1:INK 4,5,1
1110 FOR Z=15 TO 21 STEP .2:LINE 0,Z TO 200,Z
1120 END DEFine SETUP
1130 :
1140 DEFine PROCEDURE INIT
1150 RANDOMISE:C%=3:D%=4:X%=200:Y%=220:F%=0:CAT%=4
00:SCORE%=0
1160 END DEFine INIT
1170 :
1180 DEFine PROCEDURE MOVE_RIGHT
1190 GRAPH C%,D%,3:D%=D%+1:GRAPH C%,D%,1:X%=X%-6:Y
%=Y%-6
1200 BEEP 0,X%,Y%,10,10,14,1,2
1210 REPEAT RIGHT
1220 GRAPH C%,D%,3:C%=C%+1:GRAPH C%,D%,1
1230 IF PIX(D%,C%+1,4,3)<>0:CRASH_R
1240 IF C%=28:EXIT RIGHT
1250 IF F%:BOMB
1260 IF F%=0 AND KEYROW(1)=64:F%=1:G%=C%:H%=D%+1:B
OMB
1270 END REPEAT RIGHT
1280 END DEFine MOVE_RIGHT
1290 :
1300 DEFine PROCEDURE MOVE_LEFT
1310 GRAPH C%,D%,3:D%=D%+1:GRAPH C%,D%,2:X%=X%-6:Y
%=Y%-6
1320 BEEP 0,X%,Y%,10,10,14,1,2
1330 REPEAT LEFT
1340 GRAPH C%,D%,3:C%=C%-1:GRAPH C%,D%,2
1350 IF PIX(D%,C%-1,4,3)<>0:CRASH_L
1360 IF C%=3:EXIT LEFT
1370 IF F%:BOMB
1380 IF F%=0 AND KEYROW(1)=64:F%=1:G%=C%:H%=D%+1:B
OMB
1390 END REPEAT LEFT
1400 END DEFine MOVE_LEFT
1410 :
1420 DEFine PROCEDURE BOMB
1430 GRAPH G%,H%,3:H%=H%+2:GRAPH G%,H%,4

```

```

1440 IF H%>24:TROUGH1:RETURN
1450 IF H%>23:TROUGH2:RETURN
1460 IF PIX(H%+1,G%,4,3)<>0:EXPL
1470 BEEP 0,X%,Y%,10,10,15,1,2
1480 END DEFine BOMB
1490 :
1500 DEFine PROCEDURE TROUGH1
1510 F%=0:GRAPH G%,H%-1,3:GRAPH G%,H%,7
1520 END DEFine TROUGH1
1530 :
1540 DEFine PROCEDURE TROUGH2
1550 F%=0:GRAPH G%,H%,3:GRAPH G%,H%-1,3:GRAPH G%,H
%+1,7
1560 END DEFine TROUGH2
1570 :
1580 DEFine PROCEDURE EXPL
1590 BEEP 0,3,6,4,4,15,10,5
1600 GRAPH G%,H%-1,3:GRAPH G%,H%,3:GRAPH G%,H%+1,5
:GRAPH G%,H%+1,3:F%=0:SCORE%=SCORE%+5
1610 END DEFine EXPL
1620 :
1630 DEFine PROCEDURE WIN
1640 BEEP:J%=1:GRAPH 3,23,3:GRAPH 3,24,1
1650 REPEAT SOUND:BEEP 0,J%:J%=J%+1:IF J%=40:EXIT
SOUND
1660 BEEP:STRIP 2:INK 6:AT 5,10:PRINT"CONGRATULATI
ONS!":CATCH:GET_SCORE:GAME_Again
1670 END DEFine WIN
1680 :
1690 DEFine PROCEDURE CRASH_R
1700 GRAPH G%,H%,3:GRAPH C%,D%,3
1710 GRAPH C%+1,D%,5:X%=0:Y%=0
1720 REPEAT SOUNDL:X%=X%+1:Y%=Y%+1:BEEP 0,20,40,4,
4,15,X%,Y%:IF X%=15:EXIT SOUNDL
1730 BEEP:GRAPH C%+1,D%,6:CATCH:GET_SCORE:GAME_AGA
IN
1740 END DEFine CRASH_R
1750 :
1760 DEFine PROCEDURE CRASH_L
1770 GRAPH G%,H%,3:GRAPH C%,D%,3
1780 GRAPH C%-1,D%,5:X%=0:Y%=0
1790 REPEAT SOUNDL:X%=X%+1:Y%=Y%+1:BEEP 0,20,40,4,
4,15,X%,Y%:IF X%=15:EXIT SOUNDL
1800 BEEP:GRAPH C%-1,D%,6:CATCH:GET_SCORE:GAME_AGA
IN
1810 END DEFine CRASH_L
1820 :
1830 DEFine PROCEDURE GAME_Again
1840 CATCH:MAINWIN:TOPWIN:INK#3,1
1850 PRINT#3"\ [PRESS 'Y' FOR YESJ"\
1860 PRINT#3," [PRESS 'N' FOR NOJ"\
1870 INK#3,0:PRINT#3," DO YOU WANT ANOTHER GAME?"
1880 REPEAT SCAN
1890 POKE 163976,1:A%=CODE(INKEY$( -1))
1900 IF A%=78:CLOSE#3:OPEN#2,SCR:PAPER 0:PAPER#2,1
:INK#2,7:NEW
1910 IF A%=89:EXIT SCAN
1920 END REPEAT SCAN
1930 MAINWIN:TOPWIN:SKILL:GO TO 130
1940 END DEFine GAME_Again
1950 :
1960 DEFine PROCEDURE CATCH
1970 REPEAT DELAY:CAT%=CAT%-1:IF CAT%=0:CAT%=400:E
XIT DELAY
1980 END DEFine CATCH
1990 :
2000 DEFine PROCEDURE GET_SCORE
2010 STRIP 2:INK 6:FLASH 1:AT 7,13:PRINT "SCORE=";
SCORE%:FLASH 0:CATCH
2020 END DEFine GET_SCORE
2030 :
2040 DEFine FuNction PIX(R%,C%,X%,Y%)
2050 LOCAL A%,P%,B%,A:P%=C%*B+X%
2060 A=131072+(512*R%+Y%*64+P% DIV 4)*2
2070 B%=PEEK(A+1):A%=PEEK(A):P%=P% MOD 4
2080 IF P%=3:RETURN ((2 && A%)*2)+(3 && B%)
2090 IF P%=2:RETURN ((8 && A%)DIV 2)+((12 && B%)DI
V 4)
2100 IF P%=1:RETURN ((32 && A%)DIV 8)+((48 && B%)D
IV 16)
2110 IF P%=0:RETURN ((128 && A%)DIV 32)+((192 && B
%)DIV 64)
2120 END DEFine PIX

```

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# MICRO ADS





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# MICRODRIVE EXCHANGE

## PROGRAM OF THE MONTH

Despite a deluge of programs for the purpose of producing seasonal greetings, Microdrive Exchange has remained refreshingly free of the Christmas spirit.

Program of the Month for December is *Darts* by K.B.G. Judson. The game is as near as possible a computer

simulation of the pub game. The only elements not included are 15 pints of bitter and an atmosphere so smoky you cannot see the board from eight feet.

There are two indicators, one vertical and the other horizontal. Each in turn fluctuates violently up and down the scale and the player must hit the space bar at exactly the correct moment to send the dart on a high-scoring trajectory.

## Update

Whoops! Who forgot to include charges for the three additions to Microdrive Exchange last month? As you can see from the order form, charges have been included for all the programs. Sorry if we caused any inconvenience.

We would be grateful if those who sent orders with no

remittance would re-submit your orders.

One last thing. Please do not forget to allow plenty of cartridge space when ordering software. Next to each program title is an indication of the number of Microdrive sectors it occupies. Practically speaking, a Microdrive will hold slightly more than 200 sectors. If your order exceeds that length, make sure to send sufficient cartridges.

## ORDER FORM

Author	Language	Program Name	Price	Issue	Size
Giles Todd	(B)	DIY Assembler	£5	Mar/Jun	120 <input type="checkbox"/>
<i>Converts Assembler source into m/c object code</i>					
Richard Cross	(AO)	Mini Monitor	£3	Oct	60 <input type="checkbox"/>
<i>Pocket-sized monitor with comprehensive facilities</i>					
A Didcock	(B)	Connect4	£1	Sept	15 <input type="checkbox"/>
<i>Pit your wits against the QL</i>					
Shergold & Tose	(B)	*Golf	£2	May	35 <input type="checkbox"/>
<i>From fairway to green on 50 courses of varying difficulty</i>					
Williams & Holliday	(AO)	Paladin	£5	Apr	70 <input type="checkbox"/>
<i>The basis of our games programming series — a Space Invaders type-game written entirely in machine code</i>					
Richard Cross	(MB)	Sprite Animation	£2	Apr	50 <input type="checkbox"/>
<i>A subtle blend of machine code and SuperBasic which produces a versatile sprite designer and high-speed animator</i>					
Steve Deary	(B)	Pacman	£1	Mar	20 <input type="checkbox"/>
<i>A reasonably fast rendition of the famous arcade favourite</i>					
Andy Carmichael	(B)	Family Tree	£3	Aug	100 <input type="checkbox"/>
<i>Archive program and database for setting-up and displaying large family trees</i>					
James Lucy	(B)	Composer	£3	Oct	50 <input type="checkbox"/>
<i>Composer and play sheet music on the QL</i>					
Mathew Capp	(B)	Miners	£2	Aug	30 <input type="checkbox"/>
<i>A nail-biting management simulation which puts you in charge of the NCB</i>					
P J Smith	(B)	*DIY Adventure	£1	Feb	60 <input type="checkbox"/>
<i>A skeleton framework where you have to slot in the details to create your bespoke adventure</i>					
R Green	(B)	Othello	£1	Aug	25 <input type="checkbox"/>
<i>A 3D version of the well-known board game Othello for one or two players</i>					
S J Ackers	(S)	*Touch Type	£4	Aug	80 <input type="checkbox"/>
<i>Touch-typing course — 14 lessons, on-screen keyboard, 800+ word vocabulary and WPM readout</i>					
Rob Sherratt	(AO)	FCOPY	£4	Mar'86	80 <input type="checkbox"/>
<i>A machine code Microdrive utility for turbocharged file copying</i>					
Alan Prior	(B)	World Map	£2	Mar'86	80 <input type="checkbox"/>
<i>A high-resolution multi-coloured map of the world for geography buffs</i>					
J M Dower	(B)	Mushyman	£2	Jun/Jul'86	15 <input type="checkbox"/>
<i>Mushroom munching arcade action</i>					

Tony Quinn (S) \*CAD QL £4 Sept'86 180

*Professional features include rubber banding and user-definable symbol library*

Stuart Campbell (MB) Attack of the Things £3 Oct'86 45

*Can you repulse the attacking Things?*

Karl Jeffery (MB) Starport 2001 £3 Nov'86 40

*An authentic version of the arcade game Galaxians*

Marcus Jeffery (S) QL Go £4 Apr/May'86 40

*A must for strategy games enthusiasts*

J P Hartrey (B) Britain £2 Nov'86 20

*Improve your geography knowledge with this round Britain quiz*

KBG Judson (S) Darts £2 Dec'86 30

*The popular pub pastime in pixels*

B = SuperBasic, AO = Assembler + Object Code (ready to run), MB = Machine Code + Basic Loader, S = Supercharged

Name .....

Address .....

No. of programs ordered ..... Total cost £.....

Total sectors

(max. 200 per drive) .....

No. of drives sent .....

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Please copy on to Microdrive the programs above which I have indicated with a cross. I enclose a cheque/PO to the value of £..... made payable to *Sinclair QL World*. I understand that *Sinclair QL World* undertakes to supply only these programs (copied on to Microdrive) and accepts no liability for their operation as defined by the author. Neither can *Sinclair QL World* supply additional information about any of the listings other than that originally printed. Any article reprints required must be ordered and paid for separately at £1 each inclusive of post and packing (£2 overseas).

# NEW RELEASES

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The extensions operate in mode 4 and mode 8 and are compatible with the Supercharge® compiler. In addition, a comprehensive user manual is supplied plus utilities and example routines.

Also included - the program **TRANSFER** offers facilities for processing and freehand copying of images between two independent screens using a selection of brushes and airbrushes. Stunning results can be obtained using this unique utility. No other software available for the QL is capable of processing images in this way.

**Whether you draw, paint, write games or utilities, if your programs use the QL's graphic capabilities, they will be greatly enhanced by the many extensions provided by GRAPHIC TOOLKIT.**



**PYRAMIDE  
SOFTWARE  
PRESENTS:**

## MORTVILLE MANOR, ★ ★ ★ ★ ★ Sinclair User, Sept '86, John Gilbert

An urgent telegram, the anguished plea of an old friend and the chance to revisit your childhood home build up the Poe-like atmosphere.

It's an unusual adventure in both plot and execution. Motive, rather than monsters, makes up the game, which includes a novel use of window graphics.

Mortville Manor has a good smattering of characters, all of whom are relations of Julia, the friend who pleaded with you to come to the house, but was murdered before you got there.

The discussion mode lets you talk to the house guests, but the vocabulary is limited and your audience unresponsive if you don't ask the right questions. It's a hard slog but, coupled with the information gleaned from characters and the furnishings in their bedrooms, you'll suss out the mastery plot to usurp the family fortune and heritage. Edgar Allan Poe and the inhabitants of Usherland would be pleased with this plot.

Mortville Manor is a show house for the mystery contained in Pyramide's latest game. It contains all the elements for the solution of the puzzle but is not, literally, the scene of the crime.

The game pulls off a difficult conjuring trick. It has all the hall marks of a classic who-dunnit but you must realise that the solution lies in how the characters live and react.

Pyramide's adventure is for stickers who like a good mystery and are willing to play for months to get into the game.

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'The three dimensional graphics are stunning' (Popular Computing, 21-27 August '86)

'This game is absolutely incredible... in a class all by itself. There is really nothing on any other computer that can compare with it for the truly innovative visual effects it creates. Other games on the QL are good. On a scale of one to five, this game rates a ten.' (The QL Report, Copyright 1986, Curry Computer, U.S.A.)

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'One of the most exciting utilities for the QL'

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